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STATE OF OREGON

REVISED.

A BOOK OF STATISTICAL INFORMATION TREATING UPON OREGON AS A WHOLE, AND BY COUNTIES

COLLATED AND PREPARED BY

THE STATE BOARD OF AGRICULTURE

BY DIRECTION OF THE

LEGISLATIVE ASSEMBLY OF OREGON.

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THE RESOURCES

OF THE

STATE OF OREGON

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INTRODUCTION.

The State Board of Agriculture, in 1888, made, to the Governor of Oregon, an appendix to the financial report of the Board for that year, showing the material and natural resources of the State.

An edition of twenty-one thousand was published. There was such a great demand for the book that the edition was soon exhausted, and the Legislature of 1889 ordered another edition of twenty-five thousand of this supplemental report to be published. Both editions having been some time exhausted in distribution throughout the United States, and elsewhere, and frequent calls being made for the same work, it became imperative to either print another edition of the same report or to prepare and issue a new one. Three years had passed since "The Resources of Oregon" was published. The population of the State having largely increased, improvements and developments in nearly every branch of our industries having been made, it was deemed best to issue a later report. Accordingly, the Legislature of 1891 adopted the following:

HOUSE JOINT RESOLUTION NO. 9.

Whereas the law creating the State Board of Agriculture and all other Agricultural Societies in the State provides that they "shall collate and distribute reliable information to encourage immigration;" and, whereas there are several counties in the State which are not included within any agricultural district; and, whereas the edition of "The Resources of Oregon" ordered printed by the last Legislature is out of print, having been distributed abroad; and, whereas there has been and is now a great demand for reliable statistical and descriptive data relative to the agricultural and other industrial interests of Oregon from all parts of the Union; therefore

Be it Resolved by the Legislative Assembly of the State of Oregon:

That the State Board of Agriculture be and is hereby authorized and directed to collate reliable descriptive and statistical data relative to the agricultural and other industrial interests of the State at large and by counties; said information when compiled not to exceed in size a pamphlet of two hundred printed pages.

Resolved further, That the several agricultural societies within the State be and are hereby directed to prepare and forward to the State Board of Agriculture reliable information showing the resources of the counties embraced in their respective districts; and the State Board is also empowered to invite the co-operation of the various Boards of Trade and citizens of the several counties within the State in obtaining the most correct information relative to the natural advantages and resources of their respective cities, towns and counties.

Resolved further, That the Secretary of State, upon the delivery of the manuscript to him, shall cause to be printed fifty thousand copies of the pamphlet, also suitable maps,

and shall, when the pamphlets are completed, cause the same to be distributed at the World's Fair, and elsewhere, in such manner as he may deem most convenient and practicable for the purpose of inducing immigration to this State.

Adopted by the House, February 18, 1891.

T. T. GEER,
Speaker of the House.

Adopted by the Senate, February 18, 1891.

JOSEPH SIMON,
President of the Senate.

Subsequently the State Board of Agriculture proceeded to carry out the requirements of the foregoing resolution, and on the 18th day of November, 1891, made, and caused to be entered in its journal, the following order:—

That the Secretary be authorized and directed to make a collection of statistical and descriptive information of the resources of the State of Oregon in accordance with Resolution No. 9 of the Legislature of 1891, at as early a day as possible.

In compliance with said order, the Secretary at once commenced to collect data and engage competent and reliable contributors.

In the following pages each branch of the material resources of the State, and the leading industries of the people thereof, is treated. The statements made are absolutely reliable, not in the least overdrawn, and will afford the reader or student a succinct and trustworthy account of the condition, progress, industries, resources, and possibilities of the State of Oregon and its people.

It has been extremely difficult to obtain accurate figures which would enable the Board to show the relative improvement and condition of the different departments of industry, hence but few tables appear. It was expected to have the advantage of the United States census reports for 1890, but the movements of that Bureau are necessarily slow, and no information could possibly be obtained from that source in advance of the publication of its reports.

While the Legislature of Oregon made provision for printing this report, it inadvertently omitted to make an allowance with which to pay for collecting and collating the information. The State Board of Agriculture was not able to pay for making such a canvass as was necessary to secure the data it so much desired, and which would have added greatly to the value of this publication. The Board was in hopes it would be able to show in this work the exact number of acres of land in cultivation in Oregon, and the yield per acre of the different cereals, fruits and vegetables. To do this would have required an agent in every county and precinct in Oregon to interview each agriculturist personally. The expense necessary to prosecute such a work was so large that the Board without funds was forced to abandon the enterprise.

In all cases where articles have been prepared, the author's name accompanies his contribution; and where matter has been taken from papers, reports, or other source, the proper credit is given where it was possible to give it.

The Board feels grateful to the public-spirited gentlemen who have contributed to the succeeding pages, and it sincerely hopes and believes that the public will appreciate their efforts.

Description of Oregon.

Oregon lies between the 42° and 46° north latitude, and between 116° 40′ and 124° 45′ longitude west from Greenwich. The distance from north to south is 275 miles, and from east to west about 350 miles. It contains 95,274 square miles, or 60,076,000 acres of land, consisting of valley, hill, table-land, and mountain. On the west it is bounded by the Pacific Ocean, and on the north by the Columbia River almost to its eastern limit. The Columbia is practically navigable from its mouth to the point where it leaves the northern boundary of Oregon. Rapids at the Cascades and The Dalles preclude the passage of vessels, but if these places were provided with locks or ship railways, all the northern and northwestern part of the State would enjoy uninterrupted navigable communication with the Pacific Ocean. It is proper, in this connection, to say that the Government has commenced the construction of locks at the Cascades, and the State of Oregon has now in operation at this point a portage railway, pending the completion of the locks.

On the coast are nine different inlets from the sea, not including the mouth of the Columbia, which afford harbor facilities for vessels from the size of the small trading sloop to the large size coasting steamers and schooners. The Columbia is one of the best harbors in the world, and will admit the largest class of vessels. Parallel with the seashore extends the Coast Range of mountains with an average height of three thousand five hundred feet, densely covered with timber, the most of which is valuable for lumber. At some points these mountains reach down to the ocean, but for the most part there is considerable country between the mountains and the beach, valuable for farming, grazing, and lumbering. Streams put down from this range, several of which are navigable quite to the foot of the mountains, and run through rich bottom lands, valuable for timber and cultivation.

Between the Coast Range and the Cascade Mountains lie the Willamette, Umpqua, and Rogue River Valleys. The first two are separated by a short and low range known as the Callapooia Mountains. Umpqua Valley is named from the river which drains it, which stream flows through the Coast Range and empties into the Pacific Ocean. Rogue River drains the valley of the same name. It also pierces the Coast Range. The surface of the country from the Callapooia Mountains to the northern boundary of California is diversified by low hills and valleys, the whole fertile and adapted to agriculture, fruit growing, and grazing purposes.

The Willamette Valley.

The Willamette is the principal valley in the State, and constitutes the wealthiest portion of Oregon. It is drained by the river of the same name, which stream is navigable for a distance of one hundred and twenty-five miles from its mouth. It flows northward about midway between the Coast Range and the Cascade Mountains, and empties into the Columbia River at a point about one hundred miles from the ocean. The valley begins, so to speak, at the Callapooias on the south, and extends to the Columbia River on the north, a distance of about one hundred and thirty miles. It has an average width of sixty miles, not including the mountain slopes, and comprises one beautiful sweep of valley, containing about 7,800 square miles, or 4,992,000 acres of land, all of which is highly fertile. From their sources in the Cascades flow westward the Clackamas, Molalla, Pudding, Santiam, and McKenzie Rivers and empty into the Willamette. The Coast Fork is an important branch of the Willamette. From their sources in the Coast Range flow eastward the Tualatin, Chehalem, Yamhill, La Creole, Luckiamute, Mary's, Long Tom, and Callapooia Rivers, which also empty into the Willamette. These are all streams of importance, several of them navigable, and each drains a considerable country in the foothills valuable for agriculture, fruit, stock, and timber. At about the center of the Willamette Valley is the Minto Pass over the Cascades. Through this pass the Oregon Pacific Railway Company is constructing a railroad which will traverse Eastern Oregon. The Oregon Pacific reaches deep water at Yaquina Bay (which is about midway of the Oregon coast), from which point it has in operation about one hundred and thirty miles of road eastward to the western base of the Cascade Range.

The flanks or slopes of all the mountain ranges are covered with forests of fir, cedar, and oak, immensely valuable for lumber. "The Willamette River flows parallel with the coast from which it is distant, in the mean, about fifty miles. The summits of the Coast Range are at distances varying from twenty to thirty-eight miles from the sea, while the mean distance of the Cascade Range from the Pacific may be set down as one hundred and ten miles. The mouth of the Willamette is in latitude 45° 32′ north; longitude 122° 45′ west of Greenwich. The southern extremity of the valley is approximately in 43° 40′ north latitude. The States of Wisconsin, Michigan, New York, and Massachusetts are in nearly the same latitude.

"The elevation of the center of the valley ranges from seventy feet at base of the falls at Oregon City to four hundred feet at the southern extremity. There are broad and fertile prairies, separated by streams, shaded by strips of woodland, and the heavy forests of timber trees covering the mountains and hilly slopes as with a garment.

"Outside of the level prairies there is a belt of rolling land verging into hills and mountains in the higher portions, which extends almost entirely around the valley, and constitutes a very valuable part of the country. The soil is mainly basaltic and sandstone, and of great general fertility. Its products are more diversified than those of the lower lands, and frequently exceed

them in quality. These rolling or hill lands are usually covered with brush, and require to be cleared before cultivation is possible. The principal advantages of these brushy tracts are good soil, natural drainage, good water, a climate beyond the reach of malaria, an ample and general supply of wood for fuel and building purposes, and comparative freedom from early frosts. The latter consideration has not yet received due attention, but it is probable that a moderate elevation secures here the same advantages as are known to exist in the hilly regions of California and elsewhere.

"The tract now being described does not by any means embrace all the so-called brush lands of the valley, but includes the greater portion. There are comparatively small tracts of bushes and young trees in nearly every section, but they are isolated by stretches of prairie. The foot-hill lands, as we may with propriety term them, lie at an elevation of from 500 to 2,000 feet, roughly speaking, and vary greatly in width between those boundaries. At present it is only to stock-growers that these lands present encouragement. To them the excellent water, green grass, and freedom from burrs that injure wool, are superior inducements. When cleared, the brush lands will be as productive as any that exist. Such special occupations as bee-keeping, the raising of goats, the fattening of cattle for the shambles, and the raising of most varieties of fruits and vegetables, will doubtless find a better location there than elsewhere.

"Large quantities of these desirable lands, mostly wooded, lie upon the upper courses of nearly every one of the tributaries of the Willamette, and only await the hand of the energetic settler to produce abundantly. Such lands have the advantage of drying earlier in the year than valley lands, whereby it becomes possible to cultivate the soil to a better advantage. The cause is the water runs quickly off these sloping surfaces, whereas it remains for a time on the level plains, and is only removed, usually, by the slow process of evaporation. A greater variety of farm products can be raised in the hills, and their quality is choicer.

"The greater extent of valuable hill lands exist in Lane and other southern counties, where, on the large affluents of the Willamette, room for many hundred settlers is easily found. Of these streams, the McKenzie, the Coast Fork, and the main Willamette are the principal. The second is, by way of example, a fine stream flowing northward over a rocky bottom, through narrow channels, and entering the main river not far from the city of Eugene. The McKenzie flows through large tracts of unclaimed timber and railroad lands, where settlement might be profitably made. They are accessible by means of a good road.

"Much good agricultural land lies as high as 2,500 feet, being in small isolated valleys, and difficult of access. The quality of soil is said to be high, producing with unfailing regularity the crops possible to the latitude. They are particularly adapted to stock raising, and are partially occupied for that purpose. Still there are many thousands of acres yet subject to settlement.

"The timber lands lie mainly upon the interior slopes of the inclosing mountains. The extent of the forests is prodigious, but as yet only the vaguest statements can be given as to the available quantity. Speaking generally,

there is a belt of timber trees upon the western slope of the Cascades that is twenty or more miles wide, and extending north and south the whole length of the range. A great portion of it is inaccessible at present, and will so remain for many years. The limited present demand has caused the building of a few saw-mills for the supply of isolated localities, while a considerable amount is annually floated down the Willamette or its tributaries, and sawed into lumber at convenient mills. The locality of the forest extends from the snow line downwards nearly to the plains, but may be said to terminate in the brushy lands. There are some detached bodies of evergreen trees, particularly firs, growing down in the valley, which are large enough for use as sawlogs."—*Lang's History of Oregon.*

Physical Divisions of Oregon.

The Cascade Mountains, extending north and south, divide the State into two grand divisions known as Eastern and Western Oregon. The first division embraces the counties of Wasco, Crook, Lake, Klamath, Morrow, Gilliam, Grant, Harney, Sherman, Umatilla, Union, Wallowa, Baker, and Malheur; and the second division embraces the counties of Clatsop, Columbia, Multnomah, Washington, Clackamas, Marion, Linn, Yamhill, Polk, Tillamook, Benton, Lane, Douglas, Coos, Curry, Josephine, and Jackson.

EASTERN OREGON.

As before stated, the Cascade Range separates Western from Eastern Oregon at a point parallel with the sea coast, and about one hundred and ten miles distant. These mountains are also nearly parallel with the eastern boundary of the State. Hence, this part of Oregon is nearly in the form of a parallelogram, which is two hundred and seventy-five miles long and two hundred and forty miles wide. The surface is diversified by mountains and valleys, rolling and table lands. In the northern portion, extending southerly and a little west, are the Blue Mountains; and in the southern part are Stein's Mountains, projecting from California and inclining northeasterly. Thus a water-shed is created, extending the entire length of the State, which is, in the main, parallel with the Cascades, from which the land slopes eastward toward the Snake River, and westward to the lower land east of the Cascades, through which flow the John Day and Des Chutes Rivers.

The latter named stream finds its source in the eastern slope of the Cascades about one hundred miles north of the southern bounday of the State, and flows northerly into the Columbia River. Crooked River, the main tributary of the Des Chutes, rises in the western slope of the Burnt River Mountains, flowing westerly empties into the Des Chutes about sixty miles from its mouth. The north fork of the John Day rises in the south slope of the western spur of the Blue Mountains, flows southwesterly, emptying into the main river, which also rises in the Blue Mountains, and flows westerly, northerly, westerly, and then nearly due north into the Columbia. Into these rivers flow numerous small streams. On the northern slope of the Blue Mountains and emptying into the Columbia are Willow Creek and the Umatilla River, both

streams of considerable size. Butter Creek, a tributary of the Umatilla, is a stream of some magnitude, also rising in the Blue Mountains, draining the country between the sources of Willow Creek and the Umatilla.

Silvas River and Silver Creek rise in the higher lands on the southern slope from the head waters of Crooked River, and flow southerly into Malheur and Silver Lakes. These lakes are in Grant County, about one hundred miles north of the southern boundary of the State, and about the same distance from its eastern limit. The two streams last named drain the land for a distance of, perhaps, seventy-five or eighty miles to the north and northeast of the lakes. Rising in the northwestern slope of Stein's mountains, "Dunder and Blitzen" River flows northward and empties into Malheur Lake.

Between the Des Chutes and Crooked Rivers, and the headwaters of Silver Creek on the west, north and east, and the high lands of Lake County on the south, is an extensive tract of country known as the Sage Plains. This tract at present is comparatively barren. Rain does not fall in sufficient quantities at the proper season to encourage vegetation. Irrigation, however, has developed the fact that the land is fertile and produces abundantly when supplied with water. Fortunately, too, the greater part of this tract is so situated that it can be easily furnished with an abundance of water for irrigation purposes.

On the eastern side of the water shed are Grand Ronde, Wallowa, Imnaha, Powder, Willow, Malheur, and Owyhee Rivers. Grand Ronde rises in the eastern slope of the Blue Mountains, and flows northeasterly into Snake River. Wallowa rises in the high lands midway between the Blue Mountains and Snake River, and flows north into the Grand Ronde about thirty-five miles southwest of its mouth. The Imnaha rises near the headwaters of the Wallowa and flows northeast into the Snake. Along this latter stream is a country noted for its magnificent scenery, fine lands and delightful climate. Powder River rises in the eastern slope of the Blue Mountains, flows southeasterly and empties into Snake River. Burnt River rises in the Blue Mountains, flows southeasterly into Snake River. Willow River rises in the southern slope of the Blue Mountains and flows southeasterly and empties into the Malheur. The Malheur rises in the slope of the northern extremity of Stein's Mountains, flows northeasterly into Snake River. The Owyhee rises in the northern part of Nevada and the southwestern part of Idaho, takes a northwesterly course into the eastern part of Oregon through Malheur County, turning eastward and northerly, and empties into Snake River. One tributary of the Owyhee, known as Antelope River, rises in the southern part of Malheur County, near the northern extremity of the Santa Rosa Mountains, an extension of a short California range, and empties into the Owyhee at a point about thirty miles east of the eastern boundary of Oregon, and about sixty miles north of its southern bounday. Jordan River rises on the line between Idaho and Oregon, and flows almost due west, emptying into the Owyhee River at a point only a few miles south of the Antelope.

Along most of these streams is a growth of timber, consisting of pine, fir and tamarack, a large part of which is suitable for lumber. On many of the mountain slopes timber grows in profusion; but in speaking of Eastern Oregon generally, it may be said that the supply of timber for lumber is adequate

to the present demands of the country for building and fencing purposes. It is wealthy in deposit (see the chapter on mines and mining), and in many parts of the entire extent of Eastern Oregon agriculture is pursued with profit. The extensive table and rolling lands are not at present cultivated, but they generally afford a large yield of bunch grass, hence the prevailing business of the people is stock-raising. In the counties of Eastern Oregon, in the year 1891, the value of cattle was $2,487,570, the value of sheep was $1,585,324, and the value of horses and mules was $3,017,345. For a more complete description of this part of the State, see what is said of each of the counties which compose it.

Soil.

In the valleys of Oregon the soil is a loam, dark and rich, with a subsoil of clay. The bottom lands along streams consist of rich deposits of alluvium. The "beaver-dam lands" are of this class. As the name indicates, this land has been formed through the work of these animals in years gone by, they having damned up streams, causing lakes, which have been filled with vegetable matter. The water dried and drained away as settlements encroached upon the seclusion of the beaver and drove him farther to the front. This land is wonderfully fertile and valuable to a great degree.

The soil of the uplands, naturally, is less fertile than that of the bottoms and valleys, and is a red, brown, and black loam. It produces an excellent quality of natural grass, and under careful cultivation produces good crops of grain, fruits, and vegetables.

"East of the Cascade Mountains the soil is a dark loam of great depth, composed of alluvial deposits and decomposed lava, overlying a clay subsoil. The latter rests upon a basaltic formation, which is so far below the surface as to be visible only on the banks of the deep watercourses. The constituents of this soil adapt the land peculiarly to the production of wheat. All the mineral salts which are necessary to the perfect development of this cereal are abundant, reproducing themselves constantly as the gradual processes of decomposition in this soil of volcanic origin proceeds. The clods are easily broken by the plow, and the ground quickly crumbles on exposure to the atmosphere.

"In Northwestern Oregon, adjacent to the Columbia River, although the dry season continues for months, this light porous land retains and absorbs enough moisture from the atmosphere, after the particles have been partially disintegrated, to insure perfect development and full harvests. In spite of the fact that there is scarcely a shower between May and the following October, and that the average rainfall for the year does not exceed twenty inches, there is always the requisite moisture for maturing the crops. If the rains were greatly in excess of this low average, damage would certainly ensue, and it is equally sure that if successful farming depended upon the limited rainfall there would be poor harvests. The clouds supply only in part the moisture that is needed. The warm air currents surcharged with vapor sweeping inland from the ocean up the channel of the Columbia River, prevent drouth. The moisture with which they are laden is held in suspension during the day, and

at night it is condensed by the cooler temperature and precipitated in the form of a white mist on every exposed particle of surface which earth and plant present.

"In Southeastern Oregon, notably in the vast areas of fertile lands in Malheur and Snake River Valleys, the soils are much like those of the Northeastern Oregon region, but there is less moisture. Except in a very small portion of this region irrigation is necessary to successful agriculture. Fortunately, the water supply is abundant and easily applied."

The Mineral Resources of Oregon.

By Herbert Lang.

SECTION I.—INTRODUCTION.

Within the boundaries of the State of Oregon there are found a large number of native mineral substances, of which the following list contains those of the greatest industrial importance, and which, added to an uncertain number whose presence and quantity have not been fully ascertained, makes up the sum total of Oregon's mineral wealth. The list is necessarily imperfect. The State Government makes no direct provision for the collection of statistical or technical information, and the résumé which is here presented is solely the result of private observation and research. This fact, while it explains shortcomings and imperfections, will also in some measure serve as their excuse.

The substances of which it is proposed to treat in this connection are arranged according to their present economic value, as follows: Coal, Gold, Iron, Building Stones, Brick and Pottery Clays, Quicksilver, Limestone, Silver, Copper, Platinum and Iridium, Chrome Iron, Lead, and Nickel.

To these might be added the natural cement, found at Oakland, Douglas County, which a few years since was for a short time the object of a considerable enterprise, now said to be defunct; the glass sands reported to exist on several streams which flow from granite rocks; various ornamental stones, especially opals, some of which rise to the dignity of gems; the asbestus of Southern Oregon, the fibre of which is well adapted to the uses of that substance; graphite or plumbago, found in considerable abundance in the Siskiyou Range; pumice, the product of recent volcanism, used in manufacturing; manganese ore, found in Columbia County; jet, found in Clatsop; borate of lime, called ulexite, found at Chetco, Curry County, now an article of export; zinc ore, not now utilized, but destined to be abundantly produced from the mines of the Cascade Range; ochre or mineral paint, found at many places, including the bluffs at Oregon City; heavy spar (sulphate of baryta) in inexhaustible quantities in the Yank vein, Galice Creek, Josephine County; various mineral spring waters, with which, however valuable, we have little to do in this article; lakes in the arid regions of Klamath, Lake, and Harney Counties which are exhaustless repositories of various alkaline soluble salts, which are worthy of extended notice, but concerning which we lack information. All these and doubtless many more mineral resources we have, whose prospective

value is great, but of which we can at present say little for lack of discriminating and pertinent data.

In enlarging upon the individual mineral industries, it has seemed best, for the purposes for which this article is written, to adopt the natural and obvious plan of treating each without special regard to the exact locale in which it has its seat; that is to say, without any pretense of exactly describing the condition of the industry in any given place, but rather summing its importance and its probable expansion throughout the State. For example, the names of localities where the gold placer mining industry is practiced are mainly omitted, as it might be fairly conceded that such mention would possess no great interest to readers outside of those localities. In a preceding review by the present writer of "Mines of the Northwest," published in the *Oregonian* newspaper in the autumn of 1887, and extending to great length, locality was much discussed; and the interested reader is referred to that publication. In that case, however, the matter was prepared with special reference to the local readers of the paper, who may be supposed to form a different class from those who will peruse this article.

The experience and observation of the five years which have elapsed since the before-mentioned writing was published, have led the writer to a modification in some respect of his views as therein expressed. This is especially true as to the relative importance of Eastern Oregon as a mining region. At that time a good many failures in mining enterprises were being suffered in Grant and Baker Counties, while such important outside discoveries as the Okanogan and the Coeur d'Alenes were being made, and people were overwhelmed with comparisons injurious to the profitableness and greatness of Oregon properties. But things have changed: outside mines have not proved so productive as it was imagined they would be. Some of them, purchased and developed by our home capitalists, have never yielded anything. Others, however immense their ore bodies, and however actively they have been worked, have failed to reïmburse their owners. Meantime, the number of failures of Oregon mines has decreased. The mining and milling has been done with more care and judgment than was formerly bestowed. Several productive properties have been uncovered and some of them worked at a first rate profit, while others exhibit heavy untouched ore reserves. We have not had a dead, irredeemable failure for four years past; and it can now be truthfully said that the quartz mining industry, which stood on a speculative, unsubstantial foundation in 1887, is now one of the finest, most lucrative businesses in which our citizens are engaged. In respect of solid advancement, there is none other of our mineral industries which has kept pace with quartz mining. This fact is not shown so much in increased product, though that is very noticeable, as in improved methods and in real knowledge of the business. It would be idle to attempt to predict to what this spirit of progress will attain; but for the immediate future, it may confidently be accepted that there will be a sudden expansion of the business, resulting in a much increased production, due mainly, no doubt, to the active working of several important mines, of which mention will be made under the appropriate head.

It is a pity that one cannot speak so confidently of the iron and coal industries, both of which are very peculiarly circumstanced in Oregon. There has always seemed an overplus of coal and iron ready to fall upon and overwhelm the market; but their slow development has been one of the economic wonders of our time. Doubtless, the time has not arrived for the development of an industry of the greatest magnitude; or possibly the ardent and enthusiastic views which some people have taken of the situation were too enthusiastic for the time and the conditions. What these coal and iron deposits amount to will be shown as accurately as possible; but when the economic conditions prevailing will allow them to be actively worked, is a matter of conjecture only. Meantime, the resources are not lost: they remain for the use of future years.

Before proceeding to the consideration of the different mineral deposits, it will be pertinent in this connection to again call attention, as the writer has often done before, to the real and imperative need of an official and systematic provision for the collection and dissemination of information by the State Government, bearing upon the mineral resources. Very few people (and apparently none connected with the legislature) are aware of the extent of the demand for such information, both by dwellers within our borders and by outsiders. These mineral resources, which are probably unequalled in variety in any other State or Territory in the United States, are already the foundation of many industries, and are pregnant with innumerable others. The whole population of the State could employ itself in quartz mining and make a good living at it; and there are other mineral resources almost as great. There exists, then, abundant reason for calling, systematically and thoroughly, the world's attention to what the State possesses.

SECTION II.—GEOGRAPHICAL AND TOPOGRAPHICAL FEATURES.

Before beginning the discussion of these elements of mineral wealth, we will recur to the salient geographical and topographical features of our State. It is usual to discuss in such a connection the geology of an ore-bearing region before proceeding to describe the details of occurrence, etc.; but in this case, the matter being destined for general circulation among people who are presumed to include individuals who may wish to inform themselves as to particular forms of mineral occurrences, it is deemed best to briefly discuss each group of occurrences by itself, or, in other words, each form of mineral wealth by itself, in order the more easily to satisfy individual curiosity. But in order to maintain a certain unity in construction, we will introduce the special discussions by calling the reader's attention to the predominant mineral-bearing grounds of the State.

From a topographical point of view, we can classify the mining regions very cleverly. We recognize three, or perhaps four, ranges of mountains, or groups of ranges, which contain minerals of value; and we also recognize several mineral-bearing tracts between them. Generally speaking, the minerals of value are found in mountainous, or at least elevated districts; but in Oregon some of our most important minerals are found in low valleys, and often not much above tide-water. But nevertheless there is always a connection between

mountains and mineral occurrences. For example, the coal of Coos County is found in low lands; but we would know very little indeed about its geological age, the character of the enclosing rocks, and its general relations if we did not know of its relation to the Coast Range, which in some sense has revealed the secrets of the Oregon coal measures. The same thing is true of most mineral deposits; they may exist in abundance, but it is almost always the mountain chains which apprise us, by their upturned strata, of their existence.

In Southern Oregon we have two very important ore ranges, if the expression is allowable—the slate belt and the serpentine belt. Roughly speaking, the two are parallel and extend north and south, the slates being on the east side. More critically, the serpentine belt mainly constitutes the Rogue River Mountains, which extend east to west, and branch south from the Rogue River, passing into Northern California. It covers an area, perhaps, of ten thousand square miles; and if we consider the multiplicity of mineral species and their abundant occurrence, is undoubtedly the richest mineral-bearing ground in Oregon. It contains lodes of chromic iron; of copper in its various forms; of magnetic iron in a state of remarkable purity; and of nickel; and the existence, in lodes, of platinum and iridium is strongly suspected. Of its gold and silver veins, although known to exist in the serpentine, we can only say that they have in one or two cases been found to be productive; yet the consensus of present opinion is that they are not reliable—an opinion that may yet be reversed. Of minor minerals found in the serpentine, there are magnesite, a magnesia carbonate of some value; brucite; noble serpentine, almost a gem stone; chrysoprase, a silica gem; talc, somewhat used in the arts; and other related minerals.

Thus far this remarkable belt of rocks, which covers a large part of Josephine and Curry Counties, and extends into Coos and Douglas, has not been much prospected, except by those in search of gold placer deposits, which are apt to occur at intervals along the side of running streams, whereby they have been brought from the gold-bearing slates to the east. That there is ample room for numerous and important discoveries, no one can doubt. There are probably the greatest and purest bodies of chrome iron and nickel ore of which the world has present knowledge; there is every probability of the discovery and exploitation of useful magnesian minerals on a great scale; there is a chance—a very important chance—of the finding of the platinum metals in larger quantities than elsewhere known; and finally there are immense resources, already partly explored, of copper in exceptionally pure ores. We will particularize certain of these sources of mineral wealth as we pursue the subject.

It was remarked that the slate belt of rocks lay to the east of the serpentine. This is true only in a certain sense, for oftentimes the slate crops apparently from beneath the serpentine, and is found along the streams which flow in deep cañons, while the higher eminences are of serpentine. The slate is the gold-bearing rock, *par excellence*, containing most of the worked or workable quartz vein deposits in Southern Oregon. The quartz region is rather extensive, including a good part of the country drained by the Rogue and the Umpqua and their tributaries, and by some is thought to be an extension of the gold

quartz formation of California, which is probably the case. It extends as far north as Steamboat Creek, an affluent of the North Umpqua River, in Douglas County, and westward in patches almost to the Pacific Ocean. Eastward the slates dip beneath the later formations which border the Cascades on the west. Besides the gold quartz veins and the placers, the latter of which have yielded up to date, as nearly as can be ascertained, over twenty millions of dollars, or about half the total gold product of Oregon, the slates contain no other source of wealth.

Beginning near the Rogue River and continuing northward parallel to the coast, to and beyond the Columbia, lies the mass of folded and elevated strata which forms the Coast Range. It is mainly but not exclusively sandstone, for at several points other rocks, mainly volcanic lavas, are exposed, while at other localities the streams have eroded the later rocks, revealing the older ones in places beneath. This is especially true near Corvallis, where denudation has been extensive. The Coast Range sandstones contain two important sources of mineral wealth, namely, coal and building stone.

Eastward, in the parallel range of the Cascades, whose structure is much more complex and its rocks older, we find a greater profusion of mineral wealth. Their are veins or lodes carrying gold, silver, lead, copper, and zinc; there are building stones of beauty and value. In the foot-hills coal croppings are found, which give considerable promise of future value.

Still further to the east, beyond the Cascades, lies an arid plain of late volcanic origin, in whose depressions are found lakes having no outlets, which are heavily charged with solutions of useful salts, especially of sodium. Potash salts and the borates are reported from this region, and nitre is said to have been found.

The traveler whose way lies through the central portion of Oregon will be struck by the extraordinary development of the fields of lava—by far the most noticeable rock and really the most important, in the sense of being the most abundant, in the Northwest. At first the impression received by the observer is one of utter barrenness—the abounding of desolation. Sterility seems written on the inhospitable plains, the beetling cliffs and the precipitous gorges. The rivers and minor streams roll at the bottoms of steep cañons, sometimes of great and inaccessible depth. The rocky plains are arid to the last degree. Springs break forth seldom from these dark and forbidding rocks, and the herbage with which Nature clothes the surface of the earth in more grateful climes is almost wholly absent or represented by a sparse and singular vegetation. Fully two-thirds of the State are covered by the lava rocks—the remains of the great volcanic outburst which laid almost the entire Northwest under a sea of molten stone which covered an area of 200,000 square miles to an average depth of 2,000 feet, at least, and furnished the material from which our highest mountains and most extensive plains, our deepest cañons and widest valleys are constructed. Our grandest and perhaps gloomiest scenery is amid these rocks, which, sculptured by the agency of subterranean movements, by the eroding power of water, of glacial ice and of frost, have been wrought into forms of wonderful sublimity and somber picturesqueness. But extensive as is the terrane of tertiary basalts and andesites, it offers miners little in a merely

economic way. They have as yet found but two valuable substances in the lava, namely, building stone and iron ore.

The Blue Mountain Region is a country of metamorphic rocks, granite and gneisses and basaltic lava. The mountain chain itself, covering a wide tract of country, and having many communicating ranges, with cañons and much rough intervening country, has its highest, ruggedest peaks of some metamorphic rock or granite, whose summits reach an altitude of perhaps 8,000 feet. At a lower level, and forming the plateau region through which the Powder and other streams flow, we find ordinary basaltic lava, constituting a part of that great igneous outflow which marks the period of the greatest volcanic activity that the world has ever witnessed. As remarked elsewhere, the basaltic rocks contain no regular vein deposits; but occasionally they are found overlaid with the detritus from older rocks carrying gold and constituting placers. Streams have in many places cut through the lava sheet, or in other places the scattered dykes of lava, and exposed the underlying metamorphic rocks, which contain the quartz veins from which the gold is derived. As we approach the higher elevations, the lava sheet ceases, and we find in its stead only occasional dykes, which grow scarcer about the mountain summits, but do not entirely cease even at the very highest peaks. In proportion as there is less lava, there are more of the metamorphic rocks exposed, which latter with granite make up the great mass of the mountain chains of Eastern Oregon. This fact is well exemplified in the Powder River Valley and the range called the Powder River or Eagle Creek Mountains, a range of peculiarly Alpine character, and almost unequalled for sublimity among American mountains. As the traveler from Baker City to Pine Creek mines passes over the Powder River Valley, he observes that his road lies over a somewhat even plain of basaltic rocks where little vegetation save the sage brush flourishes. About the foothills of the range some powerful streams, such as Eagle and Pine Creeks, have worn immensely deep cañons into and through the basalt, exposing in many places the stratified rocks. In their lower and middle reaches the streams have deposited heavy beds of gravel, containing gold in grains, constituting placers which have been and still are worked to a small extent. The boulders which compose a part of these deposits, and in some instances unfortunately the greater part, are granite, diorite, various kinds of volcanic rocks, and representatives of most of the metamorphic schists. At a higher elevation we find ridges of granite and mica-bearing slates, separated by enormous chasms with precipitous sides, the result of glacial action and profound faulting. Pine Creek, which flows by the town of Cornucopia, passes through a gorge whose geological features are of immense interest, as illustrating the various forms of mountain-making forces. The geological history of the Eastern Oregon Mountains is pretty clearly delineated here, where we have naked and steep mountain walls of vast height, the smoothed and planed surfaces due to glacial action, the beds of detritus brought down by the creek, glacial lakes scooped out of solid granite, faultscarps of several thousand feet displacement with abutting or opposing faces of granite and slate or granite and schist, numerous dykes of trachytic and basaltic rocks, which as well as the numerous quartz veins, can be studied in exposures of hundreds and even thousands

of feet in depth on the almost perpendicular sides of the cañon. There are granite dykes ramifying through the overlying mica slate; there are quartz veins penetrating the granite and slate, and faulted by trachytic and basaltic dykes, the basaltic faulting the trachytic kind. Thus we have a sequence in time-relation. The granite is evidently the oldest formation, but it is also evident that it was subject to movement, and became plastic subsequent to the laying down of the slate, which rests directly upon it. This plasticity, which allowed the ramifying dykes to be forced into the slate, was doubtless the result of pressure, heat and the influence of moisture; the two former forces being correlated, and both either the resultant or the cause of the mountain elevation. The quartz veins were then formed, and as geologists think, mainly through the action of chemical solutions. That the igneous dykes are of later formation, we have the amplest evidence in the fact of their faulting the veins—a fact proved in innumerable instances, as at the Whitman mine.

Much the same structure exists throughout the mountain regions of Eastern Oregon, though nowhere shown so plainly as at Pine Creek.

SECTION III.—GOLD.

Gold, whose discovery along the streams of Southern and Eastern Oregon led to the settlement and civilizing of the State, and which was the first of her mineral resources to receive recognition, occurs in most if not all of the counties, but not always in workable deposits. The formations most favorable to the royal metal are the ancient ones: the schists and slates, granites and gneisses of the world's earlier history. In these older rocks occur quartz veins in which or in their broken-down detritus the gold of commerce is found. The most important gold-producing sections of Oregon are, first, the Rogue River Valley and the adjacent country; second, the Blue Mountain Region, in Baker, Grant, and Union Counties. In Southern Oregon the veins occur in slates, mainly; in Eastern Oregon they are in hornblende schist (Eureka and Excelsior mine), mica schist, granite and slate. In the Santiam District gold is found in ancient schists in regular veins, and in an acid lava, probably rhyolite, in segregated masses, locally termed "blow-outs," of enormous size but exceedingly unreliable in tenure. Along the Coast Range, wherever the streams have cut down into the old rocks underlying the sandstone, the evidences of gold appear along the stream, the older rocks giving up a portion of that metal, and some very small placers have been formed which have yielded a small amount of metal. The "color" can be got in almost any of the innumerable streams which flow out of the Range. But considering the paucity of gold-bearing rocks of this description in these mountains, it is not surprising that so little gold is found there. The same is true of the Cascade Range north of Douglas County. The streams mostly run over rocks which are notoriously barren of gold, and, excepting a few of the larger rivers, such as the McKenzie and Santiam, none of them has produced any placers worthy of the name. The most extensive placer washings in Southern Oregon are the Myrtle Creek mines in Douglas County, the product of which is supposed to be upwards of eighty thousand dollars per year; the Coyote Creek mine, or rather succession of mines, in Josephine County; the extensive and still productive hydraulic washings near

Waldo, in the southern part of the same county; the Sterling mine and other claims on Applegate Creek and its branches, in Jackson county, the Sterling being the largest and best fitted-up placer mine in the State. In no respect do these mines differ from the gravel claims of California and other gold regions, so that details of their working may be spared. The annual product of the placers of Southern Oregon varies but little, unless through the influence of wet and dry years. Their average output for many years has been probably in the neighborhood of $275,000, including the whole gold product of Western and Southern Oregon, excepting only the gold from quartz mines, which has averaged from $20,000 to $30,000 per year only. Some undeveloped ground of much promise still remains, but there is no probable chance for an increase in placer mining. On the contrary, it is likely that it will suffer a gradual decrease henceforward, which is the common history of this branch of mining.

QUARTZ MINING IN WESTERN OREGON.

Quartz mining, which began in Western Oregon in 1860 or thereabouts, and was at first quite successful, has never attained great importance or added much to the wealth of the State. The paying mines are few, and those that have proved productive have been worked on a small scale. Certain mines of a "pockety" character occurring in Jackson County were worked early in the 'sixties and produced very well. Of milling leads, strictly so called, there have only been some four or five which were worked to any extent, and only two or three were known to have paid a profit. Quartz mining, therefore, was and still is in a backward and unsatisfactory condition. The cause is not difficult to determine: it lies in the comparative poverty of the ore and in the diminutive character of the mining and milling operations. In order to treat profitably such low-grade material, extensive plant is required, with complete and thorough apparatus for cheap milling. These requirements have never been met in Western or Southern Oregon, the miners of which still await the advent of improved and progressive methods.

GOLD IN EASTERN OREGON.

In Eastern Oregon we find a considerably different set of conditions prevailing. Here the quartz interests take precedence of the placers, at least in the estimation of the inhabitants, and in the importance of the business dependent upon them. The gravel mines furnish unsteady employment to a considerable though decreasing number of persons, scattered throughout the foothills of the Blue Mountains, the Powder River Range, and their outlying spurs, in Grant, Baker, Union and Umatilla counties. The yearly production, now sensibly diminishing, is not far from that ascribed to Western and Southern Oregon, namely, $275,000. The greater part of this comes from placer washings of some individual importance, generally owned or worked by companies or associations of whites or Chinese, the tendency being to consolidate the mining interests. It is the general opinion that this industry is incapable of any great expansion, or even of maintaining its present relative importance. The remarks ventured upon the status of the Southern Oregon placers are equally true of these, namely, that while considerable virgin ground is left

unworked, it is extremely unlikely that the average annual production will ever be much increased.

QUARTZ MINING IN EASTERN OREGON.

The quartz mines of Eastern Oregon form collectively one of the State's most important resources. They are scattered over a wide territory, occurring in formations of the most dissimilar character, and represent a wide range of values. Some of them have been very productive at certain periods of their history, achieving important records. There are at present important active mines at Cornucopia, Union County; in the central portion of Baker County; and in the western slope of the Blue Mountains. In these districts and in many others a great many promising and some paying mines and prospects are found, which only require development to become as valuable as any mines. Thus, in the Pine Creek district, Union County, over a hundred mining claims of presumed value have been worked in the last six years, a large proportion of which have developed into mines, which are in a condition to prove immediately remunerative. Taken all in all, this district probably gives better assurances of certain value than any other of its character and extent in the State. The veins are reasonably large, are exceedingly well-defined, and "go down" a vast distance, as is shown by their appearance in the precipitous bluffs facing Pine Creek. Referring the reader to the writer's description of these mines published in the *Oregonian* as previously cited, it should be said that during the intervening years a great deal of work has been done. The history of the Pine Creek mines is in effect a history of the operations of the Oregon Gold Mining Company, which located here in 1886 and have since given the locality all the stir it has ever had. They have worked two mines, the Whitman and the Red Jacket, and have demonstrated the existence of large bodies of low-grade ore, which can be milled profitably. In the district there are two stamp mills, aggregating 25 stamps; and one patent pulverizer. The total daily crushing capacity is about sixty tons. The ore is quartz carrying a small amount of free gold, with a considerable percentage of sulphurets. The former is saved on amalgamated plates; the latter are concentrated on vanners and then treated by chlorination. The treatment is thorough and tolerably cheap. About fifty men are usually employed in the various mines and prospects, but the resources of the camp are such that ten times as many should be steadily at work.

West of Baker City lie the more or less important districts of Sumter, Greenhorn, Granite Creek and others, the chief producing quartz mines being the Baisley-Elkhorn, which has made an output of probably $100,000 in two years; the Robbins-Elkhorn, which is working a heavy vein of sulphuretted gold rock; the Bellevue, whose value is said to be half a million dollars; the White Star, which has the best record as a producer of any recent discovery in this State, the production reaching $20,000 per month; and the Connor Creek, whose history goes back a quarter of a century, having been the first productive mine in Oregon, and still a producer, as the aggregate out-turn in 1891 was $12,845 for one month's run. The ordinary cost of mining, hauling and reduction is but $2.50 per ton of 2,000 pounds, a remarkably low figure and never

excelled in the Northwest, and hardly elsewhere. This mine produces, as a rule, the most ordinary description of low-grade quartz, in which the gold is mainly free, and the percentage of pyritous matters extremely small; but occasionally large and valuable pockets of rich stone are found which contain large proportions of the most beautiful metallic gold, increasing the average yield enormously. Such a pocket was found in 1888, which required a year's time to extract, and yielded a total of $104,000. Some of the rock was worth $20 per pound! The stopes of this mine, which have yielded for over twenty years sufficient ore to keep from ten to thirty-five stamps going almost continuously, are necessarily of great extent; so that the mine may be said to be the largest in Oregon, and it has been continuously productive for a longer time than any other gold quartz mine in the United States, with possibly two exceptions.

The Eureka-Excelsior gold mine, in Sumter district, is the type of quite a number of valuable lodes which were first worked some four years since. They are veins of good width, usually from two to six feet, occurring in hornblende schist. The quartz contains no free gold as a rule, but carries its wealth enclosed in a peculiar fine-grained pyrite, one constituent of which is arsenic. The gold is held so powerfully by the arsenical mineral that it does not amalgamate to much extent even after roasting. This fact has had a very serious effect upon the operations of the mining company, who, finding their costly mill useless for the treatment of their ore, have shut down, as it would seem, permanently. This result is all the more regretable as the mines are, beyond question, very rich and extensive, and with the application of additional metallurgical knowledge the problem of reduction should be easy to solve. As regards the potentialities of production, this is perhaps the leading gold mine in the State.

In a review of this sort there is not space to discuss the characteristics of many mines or to enter much into detail concerning the essentials of mining and milling. Such interesting and valuable properties as the Sanger, Elkhorn, White Star, and others, which have at late periods produced or are producing largely and adding much to the aggregate output of the mining region, are worthy of more extended description than they can receive here. This brief account may be fitly closed by calling attention to the steady increase within five years of the gold product of Eastern Oregon. In 1888 and for several preceding years statistics showed an average annual output of about one hundred thousand dollars from the quartz mines. For the succeeding five years full statistics are not available, but there is every reason to believe that the product has reached $275,000 per annum, and it may have reached $300,000. Assuming the correctness of the latter figures, and adding the sum to the placer output, the result is $575,000 as the product of Eastern Oregon—a figure somewhat beneath the popular estimation, but nevertheless founded on the best attainable evidence.

CONCLUSIONS AS TO GOLD MINING.

From all the attainable data it is concluded that the gold product of the State has averaged for five years past, $850,000 per annum. This sum is made up of the tolerably regular contributions of the placers, whose yield, though

decreasing somewhat, on the whole still retains its status; and the product of the quartz mines, which also is reasonably regular in the aggregate, though most fitful in respect of each individual mine, for, with the exception of the Connor Creek mine, hardly a single property can be called a regular producer. There is every probability that the gold product will be subject to a steady increase during the next few years, equal at least to that of the last five. This increase is likely to be due as much to the more systematic and extensive working of old as the discovery and development of new properties. Probably a heavy increase in the output of the Pine Creek mines will be felt soon; and the Eureka and Excelsior, which have the capacity to double Oregon's whole yearly gold product, will in the course of events soon begin working; and the well-known Bellevue mine, with, it is said, a half million dollars' worth of ore in sight, may at any time be actively operated. Taken as a whole, the quartz mining industry of Eastern Oregon was never in so good a condition and never gave half as much promise for the future.

SECTION IV.—COAL.

It has long been a question among geologists—a question which as yet has not found a solution—as to what age the coal deposits of Oregon were to be referred. Some have classed all the more valuable coals of the Northwest generally as cretaceous—a classification which is borne out by the researches of the U. S. Geological Survey among the coal measures of Puget Sound. But another class of geologists have regarded a large, perhaps the larger part of the Oregon deposits as tertiary. Others profess to find in some localities, notably in Coos county, representative coal measures both of tertiary and of the cretaceous formations. Aside from the scientific interest of the question, it makes no difference what age produced them. The coals exist; they are sufficiently abundant, and there are the best reasons for expecting that future search will greatly increase the number and extent of known deposits.

Our coals are mainly lignitic in their character; that is, they contain a considerable percentage of water, generally produce a brown powder when crushed, and manifest the other characteristics of lignites. They usually contain a large proportion of ash, sometimes as high as 20 per cent. The Oregon coals are not, it must be confessed, of first-class quality; in fact it is not every sample which can be pronounced good; but they serve every purpose to which they have been applied; they are as good as the average of Pacific coast coals, and with the lately invented improvements in the application of fuel to heating and metallurgical purposes, they will prove as valuable as any coal.

The principal deposits of coal lie in the stratified rocks of the Coast Range, where coal beds or indications of coal are found in innumerable localities, from the Columbia River almost to the California line. The beds are in rocks which are usually classed as tertiary; but the beds of Coos Bay, where the most important and at present the only worked fields exist, lie in a formation which has by some been deemed cretaceous, as if contemporary with the very important coal measures of Puget Sound and Vancouver Island, further to the north. The sandstones of the Coast Range in Oregon dip east and west away from the axis of the range, and are cut by running streams into cañons, val-

leys, and gulches, along many of which promising indications are found. But it happens that in many cases, especially high up in the range, the disturbances of the strata have been so great as to preclude the finding of extensive beds in proper condition for mining. Extensive flexures of the strata have taken place; much ground has been faulted; and in many cases the existing beds have been set up on edge, as it were, whereby cheap and successful mining becomes impossible or at least very difficult. The obstacles of this nature render valueless a considerable proportion of the coals, which would otherwise become a valuable resource. It is where the strata are less disturbed that systematic and successful mining becomes possible; for example, in the lower foothill region, and in the comparatively level sections adjoining the mountainous tracts, the conditions as to the position of the strata, its undisturbed condition, etc., being usually favorable there. As might be supposed, the best mines, and indeed the only ones of present productiveness, are found in the comparatively level tracts. Of these the best known are those of Coos Bay, which have produced steadily ever since the early fifties. Their present production is ninety thousand tons per annum—a quantity that is expected to be much increased during 1892. The conditions under which coal mining is carried on at Coos Bay are somewhat peculiar. There is water transportation by small coasting steamers to San Francisco, where the whole output is marketed. Labor, of course, is moderately cheap; supplies of most kinds, especially timber, are also cheap. The dip of the beds and the character of the roof are such as to facilitate the work. The quality of the coal is not too flattering. It runs rather high in impurities, and sells in San Francisco for about two dollars per ton less than the Puget Sound coals of corresponding grade. Its principal use is for steam-making, for which it is fairly well adapted, outranking the Mount Diablo coal of California for this purpose.

North of Coos Bay there are numerous localities where coal has been found, notably on Smith River, Douglas County; on several streams in Lane and Benton which flow into the sea; in Tillamook; and notably in Washington, Columbia and Clatsop Counties. These deposits are alike in their essential points, being moderately thick beds in sandstone or in a fine-grained silt containing numerous fossil leaf-impressions. These beds are frequently faulted at short distances; but in several localities they are unbroken, and represent a large area of apparently workable coal. This is particularly the case with the Nehalem beds, which bid fair to become of great economic importance. Perhaps none of the multifarious mineral resources of Oregon are more worthy of immediate attention and systematic development than the Nehalem coal-fields. Lying as they do in close juxtaposition to the more important towns of Oregon, and not far from navigable waters and existing and projected lines of transportation, it is an assured fact that their development will be rapid and their production very important. As the case stands to-day, no other unworked coal-field in the Pacific Northwest offers such inducements for the investment of capital, with an almost certainty of early returns. There seems to be no doubt of the early completion of a railway connecting Portland with Astoria, whose route would lie through the most important portion of the Nehalem field, which when built will have the effect of opening up these mineral resources.

The other localities in which coal or indications of coal are found in the Coast Range, are very numerous, but far inferior in promise to the Coos Bay and Nehalem beds. Space is wanting to mention more than the names of a few representative localities. Thus, some miles to the west of Forest Grove, a promising coal bed, or rather two beds, exist. In Benton County a great deal of search bestowed upon the ground resulted in uncovering some one or more beds near the Oregon Pacific Railway. About the head of the south fork of the Coquille River, in Coos County, considerable bodies of coal land, only partly prospected, have been found. In Looking-Glass Prairie, Douglas County, coal seams are found, and in several other places in the same county. Sam's Valley, Jackson County, was several years since the scene of a coal excitement.

COAL IN THE CASCADES.

Along the western foot-hills of the Cascade Range occur coal beds similar in nearly all respects to those of the Coast Range, but less numerous and less promising. Beds of coal of an impure quality, but not by any means worthless, have been found near Lebanon in Linn County, in Lane, and in fact in most of the counties bordering upon the range. A bed at Wilhoit Springs, which has been explored to sufficient extent to show its characteristics, will serve as a type of the whole class. It lies in a nearly horizontal position and shows no sign of faulting or folding. It maintains a uniform thickness of over four feet of coal, and is inclosed in sandstone which is filled with carbonaceous matter and leaf impressions. Somewhat lower there occurs a stratum of pisolitic limestone; and overlying these strata and the coal, is found the familiar volcanic ash, which forms so important a part of the superficial deposits all along the west side of the range. Basaltic dikes are common, and not far away the remains of a fossil sea-beach can be made out. It is probable that if cheap transportation could be had, this coal bed could be profitably worked. The quality of the coal is poor on the surface, where it is much weathered, but improves in depth. It contains much ash; its water percentage is high; it does not coke, and it is rather friable. As a steam coal it might take rank somewhat above Mt. Diablo, but below that of Coos Bay.

A newly discovered bed near Silverton, now being developed, is described as lying at an elevation of about 300 feet above sea-level, and within three miles of the S. P. R. R., to which transportation may be cheaply had. The bed is from four to five feet in thickness, including one foot of "bone." No analyses have as yet been executed of this coal, but it undoubtedly belongs to the Western Oregon series.

EASTERN OREGON COALS.

Throughout that portion of the John Day Valley where tertiary rocks are found, coal indications are numerous and some very promising locations have been made thereupon. The comparative inaccessibility of the country, however, has debarred every effort to work them, and the same cause will undoubtedly retard their development for a long time. A railroad is imperatively necessary to open up these deposits. The quality of the coal is good—equal at least to the well-known Roslyn coal, which is thought to belong to the same

geological formation. These coals are emphatically steam or heating coals, "free burning" like all the Oregon coals. Other localities where coal is found are not rare in Eastern Oregon, but none are at present worked, nor are they likely to be worked very soon, with the exception of the coal bed not far from Pendleton, which has of late attracted a great deal of attention.

CHARACTER OF THE COAL.

Although much is said about the peculiarities of the Oregon coals and their classification into anthracite, "semi-anthracite," bituminous, etc., it is probably true that no anthracite has ever been found in Oregon, and it is quite improbable that it ever will be found here, excepting as a result of local metamorphic action by igneous dykes. Even the slightest study of our coal-bearing strata will lead infallibly to this conclusion, inasmuch as the true anthracites do not in other countries occur in tertiary or even cretaceous rocks, which are our only coal measures. This is not absolute proof, of course, but it is a reason by an analogy so strong that it carries conviction. Not only do we not have anthracite, which contains invariably over 80 per cent of fixed carbon, but we do not possess any known coals containing 60 per cent of that constituent. As a rule our coals carry less than 50 per cent, with a considerable proportion of water, sometimes 10 or more per cent, with ash ranging from 5 to 20 per cent. They are, in fact, brown coal, or lignite, in nearly every case. This fact, while it injures their value materially, making them unfit for many important metallurgical and other industrial uses, simply relegates them to the domain of second-class fuels.

The principal facts which are brought out by a careful study of the occurrences of coal in Oregon—of which about one hundred and twenty are known to the writer—are these: The comparatively recent period of its formation, and the consequent comparatively slight depth, as a rule, at which the beds are found, and below which it is unnecessary and unadvisable to prospect for coal; next, the lignitic character of the deposits; and, finally, their physical character as determined by their connection with or inclusion in mountain masses, the condition of the enclosing strata determining the continuity of the coal beds. It follows from this last consideration that the further the beds are removed from the center of mountain masses, the less they are likely to be found in disturbed or contorted condition, and the more chance there is, as a rule, of finding workable deposits. From this condition, and perhaps from this alone, it follows that such comparatively undisturbed regions as the hills about Coos Bay and Nehalem River are more apt to contain workable deposits than other portions of the range, especially such disturbed and dislocated regions as Benton and Lane, and the greater part of Tillamook county. Coal seekers have confined their attention largely to the rougher parts of the country, which is very proper, as it is such regions that the exposures of the upturned strata are most numerous. But this fact, while assisting in the discovery of coal beds, diminishes the chances of their continuity. It should be remembered that the coal-bearing strata continue across the Willamette Valley and appear upon the western slope of the Cascades. They are covered, as is well known, with a great depth of basaltic rock, and in parts by a heavy layer of

drift and by lately formed soils. It is probably impracticable to even prospect for coal where the overlying deposits are as thick as they are known to be near Portland; but further up the valley the tertiary rocks come near or even quite to the surface and admit of examination. It is quite within the range of possibilities that coal may be found by sinking bore-holes in favorable places, selecting those that are remote enough from basaltic dykes to avoid the possibilities of their injurious action on the sought-for coal beds, and avoid also the annoyance of sinking the hole entirely in a volcanic neck. Probably the best results from borings of this sort would come from a careful choice of localities near the foot-hills of the Coast Range; for example, near Corvallis, or Dallas, or Monroe, or other similarly situated town. The coal-bearing strata, once identified, ought to furnish a sure guide in a search of this sort, not that the coal-measures when found are sure to contain coal at that point—for they are apt to be barren over large areas—but the search need not extend further than to prove the existence or non-existence of coal in these particular strata. Properly speaking, this prospecting is a work for the State to engage in, rather than for private individuals, since the best results could only be obtained by long-continued operations, carried on in selected localities, with a systematic study of the formations, such as would be impracticable of performance by individuals or companies.

SECTION V.—IRON ORE.

The iron ores of Oregon are found for the most part in basalt. At the Oswego iron mine, the property of the Oregon Iron and Steel Company, of Portland, the ore, which is a hydrated oxide of iron commonly called "bog iron ore" or "brown hematite," but known to mineralogists as limonite, appears to have been deposited in a bog or swamp which existed on the surface of the basaltic, or more precisely speaking, andesitic lava-flow, or volcanic débris, occupying a depression therein. The iron ore was deposited from solution in chalybitic spring waters through the agency of the organic matter of the swamp, in obedience to the laws of chemical reäctions, with which we need not here concern ourselves. Subsequently there were other lava outflows and the ore was buried deep out of sight. Tilting of the beds took place, and we now find the ore deposited in a gently sloping bed or vein, lying upon one layer of volcanic ash and covered by another. Remains of vegetable growth have been found in contact with the ore, a tree of good size being discovered penetrating the ore bed some years since. These evidences strongly support the theory of aqueous origin of the deposits, which is the commonly accepted theory of their formation. But while the consensus of evidence points strongly that way, it seems to the writer that in several occurrences of these beds of limonite, the conditions seem to indicate a kind of vein formation. For example: At Rafferty's mine, near Scappoose, a bed of ore several feet thick separates layers of andesite, which have evidently been metamorphosed by the contact, in a peculiar way, the appearances not being what one would expect to find in case of a swamp deposit, but resembling the ordinary features of vein metamorphism. In the vicinity of the Oswego iron mine there are several small veins of iron ore which partake of these peculiarities, and may be exam-

ined for evidence upon the subject. The writer considers it not unlikely that the deposits may eventually be found to be veins instead of beds and produced by the same forces that gave rise to such celebrated ore deposits as the Comstock lode, the silver deposits of Leadville, and the huge fissure veins of Butte. It is questionable if the soft gray rock enclosing—or at least supporting—the ore bodies is volcanic ash at all. It rather resembles much decomposed andesite, its chemical composition supporting the theory that it is ordinary andesitic lava which has given up some of its constituents, especially iron oxide, and become the soft, heterogeneous mass that people are in the habit of calling volcanic ash, which it much resembles in color, in weight, and in other physical properties. It is rather curious, and tending to support this view, that the rocks enclosing an iron ore bed show progressively as the ore bed is approached a greater and greater decomposition, a removal of iron, a softening of the rock mass,—exactly the symptoms that one looks for in other vein formations, but not at all what we would expect to find in the case of an ore body formed by deposition in water.

It is not fully known to what extent the limonite ores are developed in the Willamette region, but they have been traced from St. Helens on the north to Polk County on the south, a distance of seventy miles. The worked deposits are only two at present, but with the extension of the iron and steel industry there is reason to expect that more of the known deposits will be opened and worked, and new ones discovered. The quality of the ore compares fairly with any found elsewhere, both in the percentage of metallic iron and in freedom from phosphorus and sulphur. It is probable that the average contents in iron of the deposits thus far opened, would not be less than 40% (corresponding to nearly 60% ferric oxide), while of the remainder about 15% is water. The silica is uniformly quite moderate in quantity. A sample of "hard" ore, taken from the Raffety limonite mine, at Scappoose, analyzed by the writer, gave:

Silica, per cent	1.25
Alumina	5.27
Sulphuric acid	3.22
Phosphoric acid	0.34
Water	15.54
Sesquioxide of iron	74.46
	100.08

Corresponding to a content of 52.12% metallic iron.

The iron ores of what may be called the "Limonite Belt," have given rise to the splendid industry of the Oregon Iron and Steel Company, at Oswego, where is located one of the finest charcoal iron plants in the country. This ranks as the greatest single industry in the State. It is likewise the most costly and extensive mining and metallurgical installation in this State, or even in the Pacific Northwest. The works comprise tramways for conveying the ore, locomotives for moving the stock, etc., stock houses, a well-built blast furnace with improved blowing engines, hot blast stoves, casting house, and all the paraphernalia of a first-class plant. The product is charcoal pig of an excellent quality, which for more than twenty-five years has sustained a fine reputation. It is of the grade known as car-wheel iron, and supplies a good

part of the local demand for casting metal, but the larger part of the output is marketed in San Francisco. The charcoal used in the furnace, of which great quantities are consumed, is made in the neighborhood from fir wood.

As every one knows, in a general way, the lava rocks of Oregon are rich in iron. The metal exists in the rocks and in the detritus resulting from their destruction, in two principal forms: the first a silicate existing in chemical union with other silicates and forming a considerable part of the rock; and second as magnetite, a peculiar oxide of iron, which forms a part of most eruptive rocks, or else less commonly as titaniferous iron, a compound of iron with titanic acid. It is a curious statement, but one which is borne out by calculation, that there is enough iron in the lava flows which nearly cover the State to form a solid iron plate fifty feet thick over all Oregon! It is not impossible nor even unlikely that certain classes of the volcanic rocks may be utilized sometime as iron ore. This is most probable with respect to those rocks which contain large proportions of magnetite, which material can be concentrated by certain processes and separated from the worthless rocky matter. Such work is already done in the East, where magnetite-bearing rock containing less than 20% of magnetite are successfully and profitably concentrated.

SOUTHERN OREGON IRON ORES.

In Southern Oregon a single deposit of iron ore has been developed. This is the Gold Hill iron mine of Burrage & Pomeroy, which was worked by the owners some half dozen years since. It is located near Gold Hill Station, Jackson County, only two miles from the railway, and is very favorably located for working. The ore is found in a persistent fissure vein, several feet in width and traceable many hundred feet in length, and has been explored to a depth of 200 or more feet. The upper portion of the vein consists of iron ore of a high grade, principally pure magnetic oxide, and samples about 55% metallic iron, with a moderate amount of phosphorus, not enough to exclude it from the category of Bessemer ore. A considerable amount of this excellent ore is in sight in the various cuts and tunnels—enough to make the mine of large prospective value. At a depth of 200 or more feet, however, the magnetic oxide shows sulphur, and the whole vein appears to change progressively from a pure oxidized ore at the surface to an ore bearing more and more sulphur, until it becomes a solid mass of iron pyrites—the sulphide of iron—which is at present regarded as of no use for iron-making. This phenomenon of iron oxides changing into sulphides in depth is very common in mines of the precious metals, and oftentimes the covering of oxides at the top (called "iron hat") is regarded as a promising feature, indicating strength and persistency of the vein below.

The only use which has yet been made of the Gold Hill iron ore is as a flux for lead smelting, the East Portland smelter having bought, in 1887, several carloads for this use, the material proving first-class in every particular. Not far from this deposit of iron ore—in fact not more than two miles away—the series of limestone deposits exists, to which reference is made and descriptions given in another connection. There are, then, two of the principal requirements of successful iron smelting in the one locality, and both in

quantities which, though not extensive in comparison with the great Eastern deposits, still are large enough to serve as the basis of a considerable industry for many years to come. The only fuel which is accessible at Gold Hill is wood, mainly fir and pine, with oak and other hard woods. The pine and oak make excellent charcoal, as good as that with which the well known and much esteemed charcoal irons of the East are made. The wood of the Rogue River country is a much better source of charcoal than the fir of the lower Willamette Valley — for example, around Oswego — bearing a greater burden in the furnace.

It appears to the writer that the Gold Hill deposits will in the not distant future afford a very good field for the successful prosecution of the steel-making industry, on perhaps a small scale at first. It is not improbable that the increasing demand for articles of so-called "mild" steel — that is, steel made by the open-hearth process — such, for example, as bridge plates, boiler plates, architectural shapes and beams, etc., will soon warrant the construction of a small plant. The requirements of the manufacture are, first, a reasonably steady and sufficiently large demand for the product which, in order to pay, must reach say forty to fifty tons of steel daily; a sufficiency of cheap fuel, tolerably pure ore, cheap labor, cheap power, and cheap refractory materials, all of which are or can be met in a reasonably complete way at Gold Hill. The developments in the open-hearth process have made it practicable to-day to build, in any desirable location, a 15-ton open-hearth furnace plant complete, with an iron building, 80x120 feet, equipped with suitable gas-producers for gasifying wood, necessary cranes, and hydraulic machinery, all ready to run, for about $30,000; and for an additional cost of $40,000 three more furnaces with their appliances can be built. For $75,000 an open-hearth plant capable of producing 200 tons of steel ingots daily, or 60,000 tons yearly, can be constructed. In case it is desired to work up the ingots, the plant can be equipped with a blooming mill for $50,000; and for $75,000 more a rolling mill with 23, 16, and 10-inch trains can be added, with engines, boilers, iron building, and all complete. Thus for $200,000, or thereabouts, one would be able to construct and fit up a complete steel plant on a very good scale, with modern apparatus and in the latest style of the steel makers' art. Such a plant, having in view the quality of the stock which it would be possible to purchase, would doubtless use the basic hearth. The materials in demand would be charcoal pig from Oswego, and iron ore and limestone from Gold Hill; working on this, called the "pig and ore" process, the product would be basic steel, so-called. The necessary spiegel or ferro-manganese might have to be brought from the East. In the case of phosphoric irons the accompanying slag might be rich enough in phosphates to have value as a fertilizer, for which purpose hundreds of thousands of tons of similar slag are annually ground up and sold for a good price in England and Germany, adding materially to the revenue of the steel works which produce it.

REFRACTORY MATERIALS.

It is worth mentioning that of the minor requirements of the basic process of steel-making, a great deal of importance attaches to the quality of the refrac-

tory materials which are used to line the furnaces. Of late years basic materials in the form of magnesite, a carbonate of magnesia, and dolomite, the double carbonate of magnesia and lime, have come largely into use as hearth linings. Bauxite, a hydrate of alumina, has been proposed for the same purpose. It happens that magnesite is found, at least in small quantities, in Southern Oregon, occurring in the serpentine rocks about Cow Creek; and from its well known association with the serpentine groups, it is to be expected that it will be found in sufficient quantity to be of commercial value in this State. Such substances should be earnestly looked for, and then the search may be combined with prospecting for their numerous associates in the serpentine rocks, among which are chrome iron ore, magnetic iron ore, various oxidized ores of nickel and cobalt; copper in various combinations; corundum, emery, and their relatives; and the members of the talc, steatite, and related groups, some of which are useful substances, many are ornamental stones, and one—"noble serpentine"—approaches the dignity of a gem.

SECTION VI.—COPPER.

The copper deposits of Oregon are for the most part confined to the southwestern part of the State, especially in Josephine County, where, in the great belt of serpentine which covers a large portion of the county, and to some extent in other metamorphic rocks, are found those bodies of copper ore which have placed Oregon in the front rank of possible producers of copper, while the lack of development and of systematic organized effort have not as yet enabled her to add appreciably to the world's production. We may say that so far her output has been nothing, for of the two hundred and sixty million of pounds of copper which the world annually produces, it is questionable if Oregon's production has averaged a thousand pounds per year during any ten years of her history. It is now a decade since the time when Oregon was supposed to be about to step into the ranks of copper-mining States, but the prophecies of bounteous production then put forward have come to naught, and the resources which were to have been utilized still remain untouched. But at present, with the marvelous industrial activity of this decade in full vigor about us, it seems assured that these neglected resources—more sadly neglected than perhaps any other of Oregon's multifarious resources—will shortly come into use. It is hardly possible that with the extinction, or rather decreased production of such copper mines as those of Lake Superior, Butte, Montana, and Arizona, which seems only a matter of time, the cheaply mined ores of Josephine County should escape the search of those whose business is the production of copper.

The Queen of Bronze mine, near Waldo, Josephine County, has long been regarded as the greatest and most valuable copper property in Oregon. It has been worked at times in a desultory way, and some little ore extracted and shipped. This part of the country, which borders closely upon California, has two outlets—the one toward the north reaching the railway at Grant's Pass, thirty miles away; the other southwesterly, a somewhat greater distance by wagon road over a high mountain pass, to Crescent City, a sea port of Northern California. By the latter route a small quantity of ore has been shipped away for sale and treatment, but the quantity is very small.

A typical copper ore deposit in serpentine presents many points of difference from the ordinary gold and silver quartz veins—differences that are likely to puzzle the inexperienced prospector. In the first place there are no walls such as we recognize ordinarily in mining. Then the deposits are short longitudinally, are usually disconnected, and do not necessarily lie in a straight line. They generally swell out in the center like a lens, whence they are known as lenticular deposits. They of course come under the general designation of lode, and are subject to the legal interpretations and limitations of that term. It is quite surprising how many different ores having their habitat in surpentine are found therein in the lenticular form. Magnetic iron, chrome iron, copper ore, nickel ore, and their associates, are thus found, and all of them are by some scientists regarded as the result of segregation from the serpentine itself, which is shown by analysis to contain these minerals when in its unchanged condition.

These deposits or lodes in serpentine vary much in size. It is common in the serpentine belt to recognize lenses, or more properly nodules of ore of perhaps ten pounds or less, while on the Lower Illinois River, not far from its mouth, the Monarch and Ella lodes reach a thickness of forty feet. Copper pyrites containing from 12 to 20 % of copper is the principal mineral present, existing unchanged in depth, as is common in most copper mines. Oxides and carbonates of copper constitute the croppings, another common phenomenon. It is said that a little gold is also found in the ore, which may be true, as gold and copper are frequent associates.

The belt of copper ores of which we speak extends from the Queen of Bronze westward into Curry County, the deposits continuing down the Illinois to and beyond its mouth. Within this distance there is a vast area of not less than 1,000 square miles suitable for prospecting, while still the boundaries of the copper zone are not yet made out, but may probably be extended indefinitely, or as far as the serpentines continue. This very promising region is at present almost unknown.

A review of the copper prospects of Oregon would be incomplete without a detailed mention of the curious native copper of the lower foot hills of the Santiam Region, the chalcopyrite of the same section, the sulphides of the Eastern Oregon gold quartz mines, where the mineral is associated with iron pyrites, zinc blende, galena, etc., and finally, the native copper in trap rock of Baker County. None of these constitute a resource of present or of probable permanent value to compare with the Southern Oregon mines, but they may in time become productive.

SECTION VII.—CHROME.

In the same belt of magnesian rocks which contains the copper ores are found almost exhaustless bodies of chrome iron, or chromite,—the mineral which is so largely used in manufacturing as a basis of various brilliant dyes. It is an admixture of the sesquioxide of chromium with protoxide of iron, the former substance forming ordinarily about one-half of the total mass. It is a heavy, black, compact rock, extremely hard and durable, and goes into commerce to a certain extent as an article of export to the centers of manufac-

ture. People who are familiar with the quantity of available chromite in Josephine, Curry, and Douglas Counties have declared that it is sufficient to supply the world's demands for many centuries! It is true that those demands are small at present, but they are sufficient to maintain a lucrative though limited trade with the California chrome ore producers, who now mine the most of the world's production. The quality of the Oregon chromite is pronounced above the average by those who have examined it, the small quantity—a few tons only—thus far marketed having come quite up to the comparatively stringent demands imposed by manufacturers, who require at least 45% sesquioxide of chromium to be present, as a rule, in the ores they purchase. This percentage is common in the Oregon ores, where even 55% is occasionally attained. Probably 50% ore can can be relied on in the majority of the Oregon deposits, which makes a very good product, worth, according to the later rulings, about fifteen dollars per ton at tide-water There is no doubt that a considerable proportion of the Southern Oregon deposits would pay to work at present, could such rates be secured; but unfortunately, the chrome trade is now in the hands of a few parties, who maintain a monopoly of this product and discourage, as far as they are able, all development of new fields; and it is not to be expected that any extensive operations will be very successful under the present régimé.

Elsewhere we have spoken of the curious association of minerals in the serpentine of Southern Oregon. As an example, there are at the nickel mines near Riddle, ores of nickel, chrome, and magnetic iron. The chrome exists in the form of nodules of various size, ranging from pistol bullets up to masses as large as a cook stove, of great purity and high specific gravity. The smaller sizes, called "chrome shot," are common in southern Josephine and on the road from Waldo to Crescent City It is in this part of the State that the prospector for mineral treasures will find the greatest variety of ores to interest him.

SECTION VIII.—PLATINUM AND IRIDIUM.

The somewhat rare metal, platinum, for which such a sudden demand has lately arisen, in connection with the electric lighting industry, that the price has for three years past averaged two-thirds as high as gold itself, is found in the placers, and, it is believed, in the lodes of Southern Oregon. Platinum is a member of the curious association of minerals in serpentine and other magnesian rocks, and the earliest discovery of the metal "in place" was in a serpentine formation in South America. Around Canyon Creek, a noted gold placer locality in Douglas County, the gold washings show notable quantities of platinum, or, rather, an alloy of platinum with related metals. The proportion of this alloy to the gold which remains after panning is usually small, say one to ten; but sometimes it is much higher, in some instances reaching equality of weights. The alloy occurs in rounded or flattened grains, or in scales, of a whitish-gray color, and has evidently been subjected to the same grinding and polishing process as the gold itself. It is slightly heavier than gold, but the difference in specific gravity is not such as to allow of their easy separation by mechanical processes, which fact decreases the value of both the gold and the platinum. The crude platinum is an article of commerce, but its

production, which depends entirely upon the production of the associated gold, has never become important or lucrative, and probably will never be, under the present conditions. If, however, systematic prospecting should reveal the existence of ores of platinum in place, or if exceptionally rich stream deposits should be found, the industry would probably take rank among the important ones of the coast. At present the total amount of platinum and iridium metals obtained yearly in Oregon is estimated at 200 ounces, worth, in the unrefined condition, about six dollars per ounce.

A sample of crude platinum from Randolph, Coos County, analyzed as follows:

Platinum, per cent.	52.00
Iridosmine, per cent.	37.50
Gold, per cent.	00.35
Iron, per cent.	5.00
Copper and other impurities	4.90
Total	99.75

The substance, iridosmine, mentioned in this analysis, is an alloy of iridium and osmium, two metals of the platinum group, the former of which has also attained some commercial importance. It is the hardest of known metals, and is used for the tips of gold pens and for the bearings of certain very delicate philosophical instruments. Iridosmine is quite as widely disseminated as platinum, and is found in the Southern Oregon gold placers in the same condition as the latter metal, and the same remarks as to the occurrences, modes of production and limiting circumstances will apply equally. The iridosmine has usually commanded a price of about two and a-half dollars per troy ounce. The quantity annually secured in this State is about 100 ounces, which, with care in mining, might, it is judged, be increased to 1,000 ounces if we include the platinum also.

SECTION IX.—NICKEL.

Perhaps the most curious and unique mineral deposit in this country is the now famous nickel mine, three miles west of Riddle Station, Douglas County. This mine is, in the opinion of many, the most valuable mine in the State. It is a wonderful deposit, unlike any other in the world save one. Its single prototype is the nickel mine in New Caledonia, an island in the South Pacific Ocean. One description will suffice for both. The country rock originally was enstatite, a magnesian silicate which, by decomposition of a certain kind, has been metamorphosed into serpentine. In the serpentine, which forms hills and mountains near Riddle, exist cavities which have become filled with nickel ore, not forming lenticular masses, but irregular and apparently shallow depressions, sometimes acres in extent. The ore is of variable richness, and is supposed to average 5% in metallic nickel. It is composed of a peculiar hydrated nickel-magnesia silicate called garnierite, which is soft and amorphous, and of a light apple-green color. It contains, when in a state of purity, 24% of nickel. This mineral forms stains and infiltrations in the main body of the rock, and is occasionally found in masses of several pounds' weight. Associated with it is a large proportion of amorphous silica and magnesian derivatives, forming the bulk of the rock. The original unchanged

formation of enstatite from which the serpentine was derived, is exposed in the working pits which have been sunk in the ore deposits. The associated minerals, besides garnierite, are chromite, in grains and masses, magnetite, chrysoprase, a silica gem stone; chalcedonic quartz, various serpentine minerals, etc., etc.

Considering the nature of the deposit, its general accessibility as well as its known extent, it seems that the mine is intrinsically a very valuable property. It was discovered several years ago, and was at once developed by means of open cuts, no deeper workings than thirty feet being found necessary. No attempts have been made to extract and treat the ore, owing to various causes, the principal one being the presumed difficulty of extracting the metal. Metallurgically, quite a hard problem confronts the owners, for the excess of silica in the material would render smelting very costly, besides which the smelting would tend to produce a contaminated product from ores which are now marvels of purity, containing no iron, sulphur or other substance injurious to the quality of the metal. Such being the case, it would seem that a wet process of extraction, such as would preserve the purity of the product, would be most suitable. Several proposals of this sort have been made, but none as yet has been entered upon. Regarding smelting, it has been proposed to fuse the ore along with an admixture of nickel-bearing pyrrhotite from a neighboring locality, obtaining thus a nickel matte, which would probably have to be refined elsewhere. In New Caledonia the exactly similar mines are being extensively worked, and the ore for the most part shipped to Australia and France for treatment. The operations are quite extensive, and are said to be remunerative.

Regarding the future of the Oregon nickel mine, there is every reason to believe that the extension of the uses of nickel, bringing that metal more and more into demand, will cause these very valuable lodes to be worked, a consummation which will be hastened by the universal advance of metallurgical art, which invents and perfects processes as they become necessary, and will not and can not be balked by the difficulties attending any problem of ore treatment.

Meantime there is the greatest incentive to prospect for and discover other similar deposits, which there is every reason to believe exist in the great area of serpentine rocks west and northwest of Piney Mountain, the seat of the great mine. Discovery has lately shown that other lodes exist not far away, which may be found to rival the parent mine in extent. There is a vast area of unexamined ground in Southern Oregon in which these and other ores are presumed to exist, and it is partly the object of this writing to call attention to the fact, especially since the increase of the demand for nickel, consequent upon the late discovery of nickel-steel, and its important and numerous uses.

SECTION X.—SILVER.

Silver has never been an important native resource of our State, although there are silver mines within our borders, and the statistics of many years past annually credit Oregon with the production of a small amount of this metal, the product for the whole State averaging $20,000 per annum, according to the

reports of the Director of the Mint. This occurred entirely in the form of the usual alloy with gold, and was not derived from any mine of particular richness in silver. It is well known that native gold invariably contains a proportion of silver, this alloyage varying in the Oregon mines from fifty-one thousandths to three hundred thousandths fine, the remainder being gold, with traces of copper, iron, etc. Ores of silver, however, are not unknown, nor in fact are they rare in Oregon, though there are but a very few instances of silver mines having been worked as yet. The most important Oregon mining history connected with the extraction of this metal relates to the Monumental mine in Grant County, which was worked several years ago. In later years a remarkable number of discoveries of silver lodes have been made, many of which promise extremely well for the future. The most important localities so far prospected are Greenhorn District, in the Blue Mountains on the John Day drainage slope; the Bay Horse mine on Snake River; certain claims on the Powder River Range, near Cornucopia, and on the Wallowa side; and the lodes on Galena Creek, in the Santiam District.

In the first locality named a great many claims have been located and much work already done, although the discovery was made but a year since. The ore is of reasonable richness in silver, which is associated with both lead and copper ores, with a gangue of spar, making the whole very favorable for smelting. The discovery marks Oregon's latest mining boom.

The Bay Horse mine, about eight miles below Huntington, is a deposit, or more probably a series of deposits, of silver ore in quartzite. There is no regular vein, but from the richer portions of the lode ore worth over $200 per ton has been taken. A car load shipped to Denver paid $126 per ton. Copper carbonates and grey copper are abundant, and the gangue is a comparatively basic porphyry rock, the deposit being in most respects identical with the well known and productive mines of Mineral, just across the river, in Idaho.

The silver ores of Cornucopia are associated with gold to such an extent that they can better be classed as gold ores, under which head they will be discussed. In Wallowa County some promising silver ores were once found in limestone, which is very abundant in that region, but nothing of moment has been done to develop them.

The Santiam country, which is one of the most enticing of regions for the prospector, but very disappointing for the miner, has revealed some quite heavy deposits of sulphuretted ore, containing a small amount of silver, producing in many instances a low grade ore suitable for concentrating. The chief instances of such lodes are to be found on Galena Creek, the scene of certain unsuccessful mining operations some two or three years since; and near Breitenbush, a station on the Oregon Pacific Railway near the summit. The ores are usually galena and zinc blende in a gangue usually of quartz, but sometimes, as at the last named locality, of porphyritic rock, probably andesite. The latter fact points to a somewhat recent origin for the ores. The ore bodies are of considerable size and could be cheaply mined; water power is abundant, and transportation and supplies are cheap. It may be that the low grade of the ores will keep them for a long time out of use, but with cheaper labor there seems no sufficient reason why their concentration should not soon engage the attention of the mining community on this coast.

It will be seen by this brief and imperfect review that silver ores are quite widely diffused over our State, occurring in such diversity and in so many localities that there is every reason to believe that this form of mining will ultimately prove of high importance to the State. Without giving heed to the stories of high assays, which disfigure mining accounts in general, it is safe to assume that the average of Oregon silver ores contain as much of the precious metal as the average ores of any other State or Territory, and that the ore bodies are as extensive. There are, therefore, equally as good chances for the prosecution of this valuable industry as exist elsewhere.

In this connection it may be allowable to mention the curious, even wonderful fact, that silver exists in the volcanic ash, and even in the basaltic and andesitic rocks which cover so large a portion of the surface of the State. This interesting fact was first ascertained by the writer, who gathered extensive suites of specimens from all parts of the State and assayed them, with the result of finding silver in all of them! The quantity is not large; the average contents are but one-tenth of an ounce troy to 2,000 pounds of the rock, but some specimens, especially of ash, contain much more, one specimen in particular (from Wilhoit Springs) containing no less than six ounces, which admits of its classification as a true silver ore. There would be something surprising and improbable in the finding of a large body of rich material of this sort; but such a discovery is not impossible, for volcanic ejectamenta of similar description have been found to contain silver lodes of great importance and richness; *e. g.* the Calico mines of Southern California, where the ores are contained in decomposed acid lavas of age as recent as that of our basalts and ash, and perhaps more so. The reader will not be surprised to learn that the limonite iron ores of the Willamette Valley contain frequently, if not invariably, a small amount of silver, perhaps an ounce per ton in most cases. This fact seems to support the theory elsewhere suggested by the writer that the iron ores in question are not simply bog ores, but are the product of vein formation, pure and simple, deriving the oxide of iron, as well as the silver, from the enclosing masses of andesitic lava.

SECTION XI.—LIMESTONE AND MARBLE.

There are in Oregon two classes of deposits of limestone, widely differing in locality and appearance and mode of occurrence. The limestones of Southern Oregon occur in lens-shaped masses imbedded in or interstratified with the same schistose rocks which contain the magnetic iron ore of Gold Hill and the quartz veins of the same region. In the neighborhood of Rock Point, on the Rogue River, several of these lenticular bodies, of various sizes, crop out upon the hills, being somewhat more durable than the surrounding rocks. The inclosing rocks are stratified, but they are as yet unclassified, although chance observers, judging by their megascopic character and by their position in regard to the gneiss formation below, have imagined that they belong to the archæan formation, which is possibly the case. From another point of view, and one that in the writer's opinion is more plausible, the limestones and associated rocks are most likely carboniferous, since similar formations in Northern California containing similar lenses of limestone are known to be of that age,

through the researches of Mr. Diller, of the United States Geological Survey, who has published an interesting monograph upon the subject.

An analysis of the Rock Point limestone, made by J. S. Phillips, Esq., shows as follows:

Carbonate of Lime	89.4
Carbonate of Magnesia	5.3
Oxide of Iron	2.2
Silica	3.1
Total	100.0

Concerning the uses to which the limestone has been put, a small quantity has been burned *in situ*, producing lime for local wants; several thousand tons have been shipped to Portland and burned in the continuous kilns of the Portland Lime and Cement Company, in Stephens' Addition to East Portland, supplying largely the demand of Northwestern Oregon with a pure and reasonably cheap article which went into trade in competition with the San Juan article, which had previously dominated the lime business; and a small amount has been sold to the Portland lead smelters as flux, for which it is well adapted. Some large dimension blocks, quarried at Rock Point, have been used in building construction with success. It is a firm, durable stone, of pleasing color, and working up with facility into the desired shapes. It is very probable that of all the building stones of Oregon this limestone and that of the related deposits lower down Rogue River, near Grants Pass, will prove the best adapted to resisting the effects of our very damp and trying climate, which in time disintegrates all of the more porous, granular stones, like basalt, etc. The Rock Point limestone graduates into marble, as shown in the deposits near Grants Pass. Some excellent specimens of this ornamental and useful mineral have been shown from this locality. The texture of the marble is uncommonly close and solid, making it somewhat difficult to work, but assuring great durability. Different shades are procurable, mottled and veined material occurring in abundance. On Williams Creek, an affluent of the Applegate, and only a few miles from the California line, there are enormous bodies of pure limestone which contain caves of wonderful extent.

Next in importance comes the limestone deposits of Baker County, the principal of which occur on Burnt River, about three miles above Huntington. At this point the bedded deposits—limestone and associated shales, etc.—which are very much tilted, are cut through by the river cañon, exposing the limestone to a depth of several hundred feet, and with a thickness of perhaps one hundred. The same stratum crops out in the hills to the southwest and northeast, and continues into Idaho, forming very important deposits. The stone is remarkably pure, carrying usually less than 1% of insoluble residues, including silica, and burns into first-class lime. The quality available is, of course, very large, and lying so close to the railway, which passes along the cañon of Burnt River, the material can be cheaply transported. A spur of the railway connects the kilns with the main track, and everything is convenient for the production of lime on a large scale. As a matter of fact, the manufacture has already assumed large proportions, and is yearly increasing. This deposit is of greater purity than the Southern Oregon stone, and conse-

quently is a more valuable source of lime; but as a building and ornamental stone, it is inferior, lacking the strength and homogeneity which distinguish the latter. It never shades into marble, and is furthermore penetrated by numerous cracks and checks which destroy its cohesiveness.

In other parts of Baker County there are lime deposits of considerable magnitude, notably the one worked by the Baker City Lime Company, about fourteen miles from Baker City. Grant County contains considerable limestone. Union County is covered to a large extent with blue limestone, forming a thick bed. Its qualities are not known Wallowa County contains immense deposits of extremely beautiful marbles of all shades and grades, suitable for the most ornamental purposes, perhaps even for statuary. So beautiful are these stones that nothing but the lack of transportation keeps them out of use. The Wallowa marbles are among the finest and best of all the building stones of Oregon beyond a doubt.

SECTION XII.—BUILDING STONES.

The principal building stones of Oregon thus far worked can be conveniently classified, according to their lithological character, into volcanic rocks, sandstones, granites and limestones. The class of volcanic rocks is the most abundant and diversified of all, and being found in the neighborhood of the large towns, have accordingly been the most extensively utilized. These rocks include the andesites, the true basalts, the trachytes, and the tufas, or fragmentary rocks.

Andesite forms relatively the most important stone, if we regard the number of localities where it is quarried, as well as the amount of rock available for building purposes This stone is familiarly known to all as the coarse gray or bluish-gray material so much used for foundations, retaining walls, paving blocks and macadam in Portland It forms the hills upon which the city rests, and is quarried in many places in the city limits. It is generally called basalt, which is incorrect; yet the difference between it and true basalt is but slight, consisting mainly in the species of felspar, which are characteristic components of each. The eminence known as Rocky Butte is composed of andesite, which also forms the isolated hills southward from that point as far as the well-known Clackamas quarries, which are also andesite. This rock is very complex indeed, containing about 50% of silica and 15 of alumina, together with oxides of iron, lime, magnesia, soda, potash, etc. This complexity of composition renders the stone liable to decomposition in a greater degree than simpler rocks such as sandstone. The evidences of this proneness to decay may be seen in the weathering of the exposed surfaces, the color of which arises from the setting free of metallic compounds, especially oxide of iron. The same remarks apply to basalt, with which andesite is commonly confounded. The comparatively short experience which architects have had with these rocks does not permit the question of their durability to be fully settled; but as far as can at present be told, this quality is considerably lacking. The inference is strengthened by observations upon the same rock in its natural condition, where many evidences of rapid decay are met with. One of the principal causes arises from the porosity of these and other volcanic rocks,

water being likely to be absorbed, which, freezing, rends the stone. A quarry opened at Bridal Veil Falls produces an exceedingly hard, coarse-grained, grayish eruptive rock resembling trachyte, which might become important as a trimming stone, but is rather too hard to go into general use.

It will be understood upon perusal of the introductory portion of this article, that there are inexhaustible amounts of the volcanic rocks, covering most of the State and furnishing unending supplies of building material for all time to come. Perhaps the most singular in its origin of all the building stones which have been offered for public use is that from Senator Lee's quarry in Polk County. This is a comparatively soft, easily worked stone, of dull gray color, resembling in appearance some gray sandstones. It is of most singular composition and origin, being composed of fragments of volcanic rocks intermingled with particles of carbonate of lime and fossil foraminiferous shells. It must have originated from showers of volcanic particles which fell upon salt water and sank to the bottom, these becoming intermingled with the remains of the microscopic diatoms which are visible in the rock. Subsequent to its deposition decomposition took place, resulting as such decompositions usually do in the production of a quantity of carbonate of lime, which was segregated and is now found occupying cavities much as do amygdules in other decomposed rocks. Its composition corresponds, there being over 25% of carbonate of lime, and the same proportion of silica, the latter being in combination with lime, oxide of iron, alumina, the alkalies, etc. This hybrid rock is at once sedimentary and eruptive in its character, and contains volcanic particles cemented with animal remains of a long past age. It works very easily, and is exceedingly well adapted to many construction purposes.

Of the extent of the andesite and basaltic stone quarrying, no statistics are at present attainable, partly on account of the smallness of the scale upon which work is carried on. As might be supposed, the greater proportion of the andesite quarried is from the vicinity of Portland, where, however, only local needs are subserved. Quarries of andesite or basalt exist near almost every city and village in this State, within the lava region, and the stone is the favorite for building purposes on account of its cheapness. It is a reasonably good stone for most such purposes, being susceptible of ordinary finish, has strength to resist medium compression strains, and has a somber yet not unpleasing appearance when in wall. Gray and blue-gray colors are commonest. The stone has no particular rift, and hence is not a favorite with stone-cutters and quarry-men. It disintegrates on exposure to frost, which is the principal reason why the talus heap is the inevitable accompaniment of basalt cliffs. Basalt is a curious rock. Ugly and forbidding as the substance is, cumbering the ground with its boulders and disfiguring the farmer's fields and even his door-yard with its unsightly masses, it is yet the farmer's best friend, for it possesses within itself all the fertilizing minerals needed to keep his fields at the highest pitch of productiveness. It is a wonderful fact that this stone itself is a manure of no common qualifications and of boundless and inexhaustible quantity. The salts of iron which exist in basalt and its relative andesite, and to a less extent in nearly all igneous rocks, having a manurial value, are phosphoric acid and potash compounds, the most important fertilizers known, both

of them indispensable in the upbuilding of the growing crop. A rock as complex in its structure as basalt is necessarily exceedingly susceptible to decomposition by the ordinary agencies of the sunlight, air, and water, and this proneness to decomposition, while setting free the various constituents, degrading the rock to sand and dust, and going through the changes which enable the growing plant to seize upon and absorb mineral food, are exactly the characteristics which prevent lava of this kind from being a very durable building stone, while making it a lasting and reliable fertilizer.

SANDSTONE.

Throughout the Coast Range sandstones of various colors and textures are abundant, making up, in fact, the great bulk of the Range. They are generally of a gray color, shading into red, and vary from a very fine granular to the coarsest conglomerate. They are generally rather soft and lacking in coherence, but some localities furnish stones of remarkable strength and evenness of texture, specimens of which have done good duty for many years in building construction. For example: In Cole's Valley, Douglas County, may be seen a fire-place carved from five blocks or slabs of sandstone, which has been constantly used for thirty years, and shows little of the effects of wear, and the alternate heating and cooling to which such structures are exposed. This is a very severe test of a building stone, perhaps the severest which can be used, and few stones can withstand it. As a general rule it is an even grained sandstone which best stands the rapid alternations of temperature. Specimens of such stones from certain localities are so very perfect in their power to resist unchanged the extremes of temperature that they will remain intact even if thrown into water after being heated to a red heat. Such are found in Douglas and Coos Counties. Others again fissure badly, and even fly to pieces explosively if subjected to the heat of an ordinary fire. Such are the sandstones of the quarry near Jacksonville.

Some extremely handsome sandstones occur in Coos County—blue, purple and other showy colors being not uncommon. Blacklock's quarry near Port Orford, Curry County, yields a beautiful blue stone, apparently durable, and well suited for the ornamental trimmings of the finest houses. It is the equal in appearance of any stone quarried on this coast, and ought to come into general use. It is consumed only in San Francisco, where it is in considerable vogue as a trimming stone.

Along the tributaries of the Coquille River, in the Coast Range, vast exposures of the most beautiful sandstones occur. Sometimes the stone is in heavy strata, twenty or more feet in thickness without a seam. Again, they lie in sheets of great lateral extension, and from an inch or less to many feet thick. Such stone is very suitable for flagging for street work, and may be had of any desired size, up to a rod square.

The most accessible of the sandstone beds are in Benton County, near Monroe, where the South Benton Mining Company have a very excellent quality of soft stone; in Douglas County, not far from Oakland; in Cole's Valley, in the same county, and at various points on the sea coast, where schooners touch. The demand for such stone is small, being mainly for local

consumption, no business of any magnitude having yet arisen, although there are considerable imports of Bellingham Bay sandstone, a precisely similar material for buildings in Portland, a demand that could be filled equally well by the local sandstone quarries were they fitted up properly for the extracting and shipping of their product.

APPENDIX.

MINERAL RESOURCES BY COUNTIES.

Baker.—Gold in placers and veins; silver in lodes; native copper; limestone; building stones.

Benton.—Coal; sandstone; andesite; gold in beach sands; iron pyrites.

Clackamas.—Iron ore; yellow ochre; gold quartz; copper ore; andesite; galena; coal; mineral waters.

Clatsop.—Coal; potters' clay; iron ore; jet.

Columbia.—Iron ore; coal; salt springs; manganese ore.

Coos.—Coal; gold in beach sands, stream placers and quartz lodes; platinum and iridosmine; brick clays; chrome iron.

Crook.—Gold in placers.

Curry.—Iron ore; gold in stream placers and beach sands; platinum and iridosmine; chrome ore; silver ores (?); coal; borate of lime; sandstone.

Douglas.—Gold in lodes and placers; nickel ore; quicksilver; sandstone; copper ores; coal; salt springs; natural cement; chrome ore; platinum and irldosmine.

Grant.—Gold in lodes and placers; silver ores; coal; iron ores; lead ores.

Jackson.—Gold in lodes and placers; iron ore; quicksilver; mineral waters; building stones; graphite; coal; limestone; infusorial earth.

Josephine.—Gold in lodes and placers; copper ores; heavy spar; limestone and marble.

Klamath.—Mineral waters.

Lake.—Mineral waters.

Lane.—Gold in quartz and placers; limestone; zinc ore; magnetic iron ore; coal (?).

Linn.—Gold in quartz and placers; copper ores; galena; zinc blende.

Malheur.—Nitrate beds; alkaline salts.

Marion.—Gold in quartz and placers; limestone; bog iron ore.

Multnomah.—Iron ore; andesite.

Polk.—Building stones; salt springs; mineral waters; iron pyrites; limestone.

Tillamook.—Gold in beach sands; coal; rock salt; iron ore; iron pyrites.

Umatilla.—Gold in lodes and placers; coal; iron ore.

Union.—Gold in lodes and placers; silver in lodes; hessite; ochre.

Wallowa.—Gold in lodes; silver in lodes; copper; marble and limestone.

Wasco.—Mineral waters.

Yamhill.—Mineral waters; iron pyrites.

List of Mineral Localities.

ANDESITE—BASALT—"LAVA"

Clackamas.—Clackamas quarry; a fair building stone.

Multnomah.—Butte quarries; near Mt. Zion and other localities in the Portland hills; used for road material.

Andesite is a very common country rock, and belongs to the basic eruptives. It is a light gray rock, usually softer than basalt, which it resembles in chemical constitution.

ARSENOPYRITE—"ARSENICAL IRON."

Jackson.—Applegate Creek; in large deposits. It occurs in many other localities associated with or containing gold, in quartz veins. A valuable ore of gold and silver.

BARITE—"HEAVY SPAR."

Baker.—Locality unknown; the fetid variety.

Josephine.—Big Yank ledge in chute 26 feet wide.

Barite is used as a substitute for white lead; not worked in this State.

BASALT.

Occurs extensively throughout the State; is quarried as a building stone at Oregon City, St. Helens, Portland, and other localities. (See ANDESITE.)

BECHILITE.

Curry.—Five miles north of Chetco; is a borate of lime, and forms a valuable source of boric acid; now being worked.

CALCITE—"LIMESTONE" AND "MARBLE."

Baker.—In heavy strata, highly inclined, near Huntington; worked for lime by the Oregon Marble and Lime Company.

Jackson.—Rocky Point, in lenticular masses in metamorphic rocks; worked for lime, building stone, and flux in lead smelting by Burrage, Pomeroy & Co.; output of 1887, 1,100 tons of rock.

Josephine.—Williams Creek; in thick strata penetrated by caverns; quality first-class as a source of lime and building material; other localities in same county unworked.

Wallowa.—Marble of good quality and in great quantity, near Joseph; occurs as shell limestone suitable for making lime in beds in the tertiary on lower foothills of the Cascade and Coast Ranges bordering on the Willamette Valley; has been worked for lime at Butte Creek, Marion County, also in Polk County.

CEMENT (NATURAL).

Douglas.—Near Oakland; a worked deposit of alleged value, covering many acres in tertiary rocks, probably miocene; work suspended in 1890.

CERARGYRITE—"CHLORIDE OF SILVER," "HORN SILVER."

Presumed to occur in the silver-bearing veins of Oregon, but occurrences not proven.

CHALCOCITE—"COPPER GLANCE."

Douglas.—Tellurium mine, Canyonville; once worked for copper.

Josephine.—Mines of copper ore on Illinois River.

CHALCOPYRITE—"COPPER PYRITES."

Clackamas.—Divide between Clackamas and Molalla Rivers, Cascade Range; in workable deposits.

Douglas.—Cow Creek Cañon; in veins with quartz.

Josephine.—Queen of Bronze mine, near Waldo, in immense deposits, once worked. Monarch and Ellen mines, lower Illinois River, in great quantity; once worked. The most abundant ore of copper known in Oregon, but not worked.

Chalcopyrite is of common occurrence in quartz veins, where it is an important source of gold and silver.

CHROMITE—"CHROME IRON."

Coos, Curry, and Douglas.—In nodular masses of high grade ore in serpentine rocks; a valuable and important source as yet little worked.

CINNABAR—"QUICKSILVER ORE."

Baker.—Locality not known.

Douglas.—Fourteen miles northeast of Oakland; extensive deposits, of great value, which are now being worked. Output for 1891, not reported.

Jackson.—Beaver Creek mine, California line, in loose masses; no lode yet found; Evans Creek; neither deposit worked as yet.

CLAY.

Clatsop.—Smith's Landing; a fine deposit of potter's clay; worked by the Oregon Pottery Company, of Portland.

Brick clays are common throughout the State. The loam of the lower Willamette Valley is used for brick making and is found to answer the purpose tolerably, except as being very fusible. It furnishes the material for the Portland and East Portland kilns.

COPPER (NATIVE).

Baker.—Near Baker City, in a trap rock; said to exist in large quantity.

Douglas.—Bend of Cow Creek.

COPPER ORES.

(See CHALCOCITE, CHALCOPYRITE, CUPRITE, and MELACONITE.)

CUPRITE—"RED OXIDE OF COPPER."

Occurs associated with other copper ores in most copper mines. It is a decomposition product of the others. Abundant in copper lodes in Josephine County.

DYSCRASITE—"ANTIMONIAL SILVER."

Said to be the predominating silver ore at the Monumental mine, Eastern Oregon. (Doubtful.)

GALENA.

Clackamas.—Head waters of Clackamas River.

Linn.—Galena Creek, near Quartzville; reported to be argentiferous, and to exist in large quantity.

Galena is a common and sometimes quite important constituent of quartz mines, and is found in very small quantity throughout the mining districts of the State, and is said to be very abundant near Joseph, Wallowa County.

GARNIERITE.

Douglas.—Oregon nickel mine near Riddle; a very valuable deposit of nickel ore, extending over many acres, and for value only equalled by the great but almost exactly similar deposits in New Caledonia. There is a prospect that the above mine will be worked soon.

GNEISS.

Jackson—Hills between Rogue River and Applegate Creek. Valuable for building stone, but unworked. A quarry of gneissoid granite near Fort Lane.

GOLD.

Baker—In quartz lodes in Blue and Powder River Mountains; in placers on Powder, Burnt, and Snake Rivers, and many of their tributaries; in old river beds in Blue Mountains, etc.

Grant—In many quartz veins and in placers on streams tributary to John Day River.

Union—In quartz lodes and placers of Grand Ronde River, Eagle, Pine and other Creeks, and their tributaries; extensively mined.

Umatilla—In veins at head of Umatilla River; in placers on Columbia River.

Crook—In sands of Crooked River and its tributaries.

Clackamas—In lodes in metamorphic rocks of the Cascade Range; unimportant as yet; being prospected.

Marion—In lodes about the North Fork of the Santiam, in metamorphic rocks; worked slightly.

Linn—In lodes and placers near Quartzville on Canal Fork of the Santiam; worked to a small extent; lodes on Upper Calapooia River.

Lane—Lodes and placers on Blue River; lodes in Bohemia District, near headwaters of main Willamette River.

Douglas—Lodes and placers on Cow Creek, Canyon Creek, Coffee Creek, Myrtle Creek, Whisky Creek, Starve-out Creek, and other streams in southern part of the county.

Josephine—Lodes and placers on Coyote, Wolf, Grave, Galice, Josephine, Althouse, Sucker and other Creeks; Illinois River, Democrat Gulch, etc., and generally throughout the county; extensively worked.

Jackson—Lodes and placers on Applegate, Jackson, Jackass, Sterling, Poorman, Williams', Kane, Evans, Gull's, Sardine, Pleasant, Wagner, Steamboat and other Creeks in southern and western parts of the county.

Coos—Beach sands along the coast; stream placers and lodes of Sucker Creek, southeastern part of county.

Curry—Beach sands along the coast; stream placers of Sixes River.

GRANITE.

Abundant in the Cascades, Blue Mountains, Eagle and Pine Creek Mountains and elsewhere. Deposit suitable for building purposes in Coos County; Gold Hill, Jackson County; Upper McKenzie River, Lane County. Notwithstanding its abundance, granite has never been utilized as a building stone in this State. Quarries are about to be opened at various points, however, to supply the notorious lack of building material. (See GNEISS.)

GRAPHITE—BLACK LEAD, PLUMBAGO.

Jackson—Siskiyou Mountains.

GYPSUM.

Union—Eagle Creek bridge.

HALITE—"ROCK SALT."

Tillamook—Near Nestucca.

HESSITE—"TELLURIUM."

Union—Pine Creek mines; in quartz veins, associated with gold; contains silver and tellurium; very valuable but rare.

INFUSORIAL EARTH.

Jackson—Near Ashland; used as polishing powder; deposit not worked.

IRIDOSMINE.

Occurs associated with gold and platinum in the stream placers of Douglas and Josephine Counties, and in the auriferous beach sands of Coos and Curry; is a most valuable source of the rare metal iridium; is not sought for, but is mined incidentally with gold.

IRON ORES.

(See MAGNETITE and LIMONITE.)

JET.

Clatsop—Locality not known.

LEAD ORES.

(See GALENA.)

LIGNITE—COAL.

Clackamas—Wilhoit springs, in horizontal bed seven feet thick, of promising appearance; slightly prospected but not now worked.

Clatsop—Nehalem Valley, in thick strata; very valuable; works in contemplation; also other localities.

Columbia.—Falls of Beaver Creek, near St. Helens, etc.; not worked; value unknown.

Coos.—In very extensive strata near the bay; worked for many years and still producing largely; supply deemed practically inexhaustible; beds said to underlie 500 square miles; quality fair. Also on South Fork of the Coquille, in important strata in conglomerate; unworked, judged to be very valuable.

Douglas.—Looking-glass Prairie.

Jackson.—Sam's Valley, Bear Creek Valley, near Ashland.

Occurs generally throughout the Coast Range, from the Columbia to Rogue River, as in Benton County, where it crops out near the Oregon Pacific railway. Strata often much contorted and broken, rendering mining difficult and expensive. The coal being of a comparative recent age, probably later cretaceous or early eocene, and partaking of the common lignitic character, it is not usually classed as high grade; in fact much of it is poor.

On the John Day and its tributaries much coal is found, where it is proposed to mine. In the absence of reliable analyses, nothing can be said of its quality.

LIMONITE—"BROWN HEMATITE."

Clackamas.—Important beds in andesite at Oswego; worked for twenty years, supplying a single stack, making a very good quality of charcoal pig, selling to local foundrymen and in San Francisco; are worked more extensively each year. Also beds on east side of Willamette River, reaching to the foot-hills of the Cascades.

Columbia.—Scappoose; Raffety Bros.' iron mine; deposits near St. Helens similar to the foregoing.

Multnomah.—In the range of volcanic hills bordering the west bank of the Willamette, from St. Helens to near Oswego. The deposits mentioned above constitute a bed of iron ore extending from Kalama, on the south bank of the Columbia and the west bank of the Willamette to a point near Oregon City, and thence southeastward to the foot-hills of the Cascades. The ores are exceptionally pure, the quantity is great, and all the essentials for making first-rate iron are at hand.

Marion.—Lake Labish, whose bottom is overlaid with bog iron ore; also other localities.

MAGNETITE—"MAGNETIC IRON ORE."

Coos, Curry, and Douglas.—In grains, comprising great part of the auriferous black sands of the seashore. Also in nodular masses in serpentine.

Lane.—At McKenzie bridge.

Jackson.—In beds interstratified with metamorphic slates and limestones, Gold Hill, Burrage & Pomeroy's iron mine. Mined as flux for lead smelting; a valuable deposit; production in 1887, 100 tons, value at mine, $300.

MANGANESE ORE.

Columbia.—Locality and species not known.

MARBLE.

(See CALCITE.)

MELACONITE—BLACK OXIDE OF COPPER.

Josephine.—Monarch and Ella mines, lower Illinois River, in great abundance.

NITRE—SALTPETRE.

Malheur.—Locality unknown; a valuable discovery if extensive.

NOUMEAITE.

(See GARNIERITE.)

OBSIDIAN.

Central Oregon, in extensive deposits, forming hills and mountains.

OCHRE.

Clackamas.—Oregon City, in interstices between basaltic outflows.
Union.—Near Pine Valley, in basaltic rocks.

OSMIRIDIUM.

(See IRIDOSMINE.)

PLATINUM.

Stream placers, hydraulic washings and auriferous black beach sand of Douglas, Josephine, Coos, and Curry Counties. A tolerably important source of the metal, which invariably occurs with gold and is mined as an accidental product. The usual proportion of the two metals is six to eight parts gold to one of platinum, but the proportion varies, the metals sometimes being equal in quantity; at other times the platinum is entirely absent. Product only approximately ascertained. Iridosmine (*q. v.*) is an almost invariable associate of platinum.

POTASSIUM NITRATE.

(See NITRE.)

PUMICE.

Cascade Range, and Eastern and Central Oregon.

PYRITE—"IRON PYRITES."

Benton.—Contains nickel and copper.
Tillamook.—Nestucca; in lodes; auriferous.
Yamhill.—Fairdale; in reported abundance.

PYRRHOTITE—"MAGNETIC IRON PYRITES."

Douglas.—Dade Creek; niccoliferous.

SANDSTONE.

Curry.— Blacklock's quarry; a beautiful blue stone, suitable for ornamental uses, and worked for the San Francisco trade.

Douglas.— Coles Valley; a fine building stone, procurable in blocks or sheets of any desired size. Many other localities.

Jackson.— Jackson Creek; quarried for building purposes; fossiliferous.

SERPENTINE.

Coos, Douglas, and Josephine.— In frequent massive beds, containing chromite, magnetite, and ores of nickel and copper in lenticular masses. The purer varieties of serpentine are suited for ornamental uses.

SIDERITE—"SPATHIC IRON ORE."

Marion.— Near Silverton; in veins in basalt (?).

SILVER ORES.

Baker, Grant, and Union.— Monumental mine; Greenhorn Mountain; Simmons mine, Cornucopia; Joseph, Wallowa County, in veins. Invariably accompanies gold in quartz veins, usually in the proportion of about 200 parts silver to 800 gold. Occasionally the silver is in excess. In the Eureka and Excelsior mines, Baker County, the proportionate weights are equal.

SPHALERITE—"ZINC BLENDE."

Lane, Linn, and Marion.—Santiam mines in quartz; Bohemia district in large quantity, frequently gold or silver bearing, constituting an important mineral.

STIBNITE—"ANTIMONY ORE."

Santiam mines.

WILLEMITE—"SILICATE OF ZINC."

Santiam mines, decomposed from blende.

NATIVE GRASSES.

By H. T. FRENCH.

A partial list of grasses and clovers collected in Oregon, and found in the herbarium at the Oregon Agricultural College:

Elymus condensatus, Presl.
E. arenarius, L.
E. sitanion, Schult.
E. Sibiricus, L.
E. triticoides, Nutt.
E. Americanus, V. & S.
Bromus ciliatus, L.
B. breviaristatus, Thurb.
B. Hookerianus, Thurb.
B. Orcuttianus, V.
B. Suksdorfii, V.
Hordeum murinum, L.
H. maritimum, With.
Festuca microstachya, Nutt.
F. tenella, Willd.
F. Howellii, Hack.
F. occidentalis, Hook.
F. rubra, L.
F. ovina, L.

Festuca pratensis, V.
F. scabrella, Torr.
F. Myurus, L.
Oryzopsis cuspidata, Beuth.
Glyceria Lemmoni, V.*
G. nervata, Trin.
G. arundinacea, Kunth.
G. pauciflora, Presl.
G. fluitans, R. Br.
G. augustata, Ledeb.
Agropyrum glaucum, R. & S.
A. caninum, Roem.
A. divergens, Nees.
Panicum crus-galli, L.
P. dichotomum, L.
P. scoparium, Lam.
P. sanguinale, L.
P. capillare, L.
Danthonia unispicata, M.
D. Californica, Bo.
D. intermedia, V.
Arrhenatherum avenaceum, P. B.
Trisetum subspicatum, P. B.
T. canescens, Buckl.
Deschampsia calycina, Presl.
D. elongata, M.
D. variatifolia, Scrib.
D. cæspitosa, P. B.
Holcus lanatus, L.
Agrostis verticillata, Vill.
A. microphylla, Steud.
A. æquivalvis, Trin.
A. canina, L.
A. Howellii, Scrib.
A. exarata, Trin.
A. attenuata, V.
A. foliosa, V.
A. asperifolia, Trin.
A. vulgaris, With.
Calamagrostis Canadensis, Beam.
Calamagrostis Howellii, V.
C. Aleutica, Trin.
C. neglecta, Ehr.
Bucmania erucæformis, Host.
Dactylis glomerata, L.
Briza minor, L.
Distichlis maritima, Raf.
Melica bromoides, Gray.
M. bulbosa, Geyer.
M. stricta, Bo.
M. fugax, Bo.
M. Harfordii, Bo.
M. acuminata, Bo.
Kœleria cristata, Pers.
Eragrostis reptans, Nees.
Diplachne imbricata, Scrib.
Phragmites communis, Trin.
Leolium temulentum, L.
L. perenne, L.
L. Italicum,
Poa tenuifolia, N.
P. nemoralis, L.
P. Howellii, V. & S.
P. scabrata, Scrib.*
P. Hendersoni, V.*
P. macrantha, V.
P. abbreviata, R. Br.
P. gracilis, V.
P. Bolanderi, V.
P. annua, L.
P. Californica, V.
P. argentea, H.*
P. Alpina, L.
P. stenantha, Trin.
P. serotina, Ehrh.
P. gracillima, V.
P. occidentalis, V. & S.
P. Nervadensis, V.
P. compressa, L.
P. pulchella, V.
P. pratensis, L.
Avena fatua, L.
Stipa viridula, Trin.
Stipa coronata, Thurb
S. stricta, V.
Phleum pratensis, L.
P. alpinum, L.
Alopecurus geniculata, L.
A. var. aristulatus,
A. Californica, M.
A. Howellii, V.
A. pratensis, L.
Sporobodus gracillimus, Scrib.
S. asperifolius, Thurb.
S. depauperatus, Scrib.
Coleanthus subtilis, Seid.
Cinna pendula, Trin.
Polypogon Monspeliensis, Desf.
P. littoralis, Smith.
Trifolium gracilentum, T. & G.
T. ciliatum, Nutt.*
T. tridentatum, Lind.
T. microcephalum, Pursh.
T. microdon, H. & A.
T. procumbens, L.
T. involucratum, Willd.
T. pauciflorum, Nutt.
T. Macraei, H. & A.
T. Howellii, Wat.*
T. Breweri, Wat.
T. depauperatum, Deso.*
T. longipes, Nutt.
T. agrarium, L.*
T. plumosum, Dougl.
T. cyathiferum, Lyndl.
Melilotus alba, Lam.
M. parviflora, Desf.
Vicia gigantea, Hook.
V. sativa, L.
V. Americana, Muhl.
Lathyrus Torreyi, Gray.
L. Nuttallii, W.
L. littoralis, Endl.
L. sulphureus, Brewer
L. paluster, L.

Lathyrus polyphyllus, Nutt.	*Lathyrus maritimus*, Big.	*Medicago denticulata*, Willd.
L. Nevadensis, Wat.	*L. albus*, Wat.	*M. sativa*, L.

Above is a list of grasses collected in Oregon, and found in the herbarium at the Oregon Agricultural College. It is by no means a complete list, yet it contains the grasses most widely distributed throughout the State, probably, and those of greatest agricultural value to the State. We will refer briefly to the genera here represented, giving the common name by which they are known, and something of their agricultural value, as determined here and elsewhere.

There are found, within the State of Oregon, many varieties of climate, soil, geological formations, and widely varying conditions, due to precipitation, elevation, proximity to mountains, coast, etc. To take up and discuss the numerous varieties of grasses found in the varying localities, would require more space than we are entitled to, had we the data and time to compile such a treatise. Hence we shall confine ourselves to those genera which we believe to be of most value from an economic point of view.

Grass is truly said to be the basis of all successful agricultural operations. Where grass fails to grow, or has never grown, there is little hope of securing any crop of very great agricultural value. Indeed, the almost unlimited fertility of the soil, throughout a greater portion of Oregon, is due very largely to the decay of a luxuriant growth of grass, which once covered hill and dale. In the eastern and southern parts of the State, are found the more hardy bunch-grasses, which have maintained themselves in some localities for ages, furnishing an almost unlimited source of luxuriant pasturage of very high nutritive value.

The pasturage of this region is made up largely of a class of grasses noted for their ability to withstand extremes of drought, and when in a dry state furnish a source of pasturage for stock which is second to none, so far as nutrition is concerned. This peculiar quality of the bunch grass is not present in the grasses of the valley, which grow more rapidly.

It is said that grasses only attain this peculiar nutritive quality when grown 3,000 feet or more above the level of the sea. This elevation includes a large portion of the eastern part of the State, where these grasses furnish such an abundance of pasturage. While this range, which was once a vast public domain, open to any one who wished to use it, is now taken up, to a large extent, and controlled by private land-holders, it is none the less important as a grazing country. It is true in many places that the once flourishing bunch grass has been largely exterminated by the great flocks of close-nibbling sheep, yet it is still the principal source of food for thousands of cattle, sheep and horses.

The most important grasses under the head of "bunch grass," are the genera botanically known as *Stipa*, *Oryzopsis*, *Deschampsia*, *Festuca* and *Poa*. Of the coarser grasses the *Calamagrostis* furnishes several species. These are tall, stiff grasses, readily eaten by stock, very nutritious, and are commonly known under the name of Blue Joint. Certain species of this grass are found in the high, open regions of Oregon, while others are found in

the mountains, valleys, and open prairies. Wherever found it makes an excellent pasture grass, and makes good hay when cut and cured for that purpose.

In the larger valleys of the State there is found a great variety of grasses which are more or less valuable for pasturage and hay. The western portion of the State receives a greater annual rainfall, hence a more luxuriant but less nutritious herbage is found In the Coast Range grasses of all kinds grow very rank, and the coarser species—those adapted to more moisture—are found in their greatest perfection. Among those most common in this region we might mention the *Glyceria*, *Agropynum*, and *Beckmania*. These grasses are adapted to low, moist ground, along streams and in marshes.

Several species of *Elymus* (Wild Rye), are found in various parts of the State; and while not as nutritious as some of the varieties named, it furnishes a large amount of pasturage, and is often cut for hay. Mr. W. C. Cusick speaks of a species of Wild Rye, which is found in Baker County, Oregon, as follows: "This is a valuable grass, and in Baker County large quantities are cut for hay, which is said to be excellent It is also much used as a winter forage plant. Cattle are driven into the dry bottoms where it grows, and live upon it when the shorter grasses are covered with snow."

Bromus. (Cheat or Chess.) This grass, *Bromus secalinus*, is grown quite extensively in some parts of Oregon, especially in the Willamette Valley It is sown in the fall with almost as much regularity as the wheat crop, and if cut in season the following summer makes a fair quality of hay. The chief advantage in growing this grass is in the fact that it will produce a crop where many of the less hardy grasses would fail.

Hordeum (Squirrel-tail Grass), is found on the sea coast and in the interior. When young it is eaten by stock, but mainly it is of no agricultural value on account of the barbed awns which it bears.

Festuca. This genus contains a larger number of species and varieties, which are more or less valuable for pasture or meadow. It contains some of the most valuable pasture grasses known *F. scabrella* is called "the *great* Bunch Grass" in many localities, it being the most vigorous and widely distributed of any. It grows in bunches or tussock, which are difficult to cut with a machine. The grass is said to be rather coarse for sheep, but in Eastern Oregon it is one of the most important grasses for cattle and horses.

F. ovina (Sheep Fescue), of which there are many varieties, is a very important pasture grass, found widely distributed throughout the State. It is found at high elevations on the mountains, and there furnishes a short sweet herbage for sheep and other stock. It is said to be the most wholesome and nutritious grass for sheep and cattle that is known It grows in dry, sandy soils with considerable vigor. It is not valuable for hay on account of its fine, short stems and leaves.

F. elatior. (Meadow Fescue Grass.) This grass has been introduced into this State, and grows with great vigor wherever tried. It grows well on the white land, in the Willamette Valley, where the land has been drained. We do not know how it would do on land not drained While it grows rank and coarse, producing two or three tons dry per acre, it is readily eaten by stock, both as a pasture grass and in the form of hay. It is one of the few very rank growers

that is relished by stock. It is sometimes called evergreen grass, on account of its power to withstand drouth.

Oryzopsis cuspidata. (Bunch Grass.) This is one of the bunch grasses found in the eastern part of the State. It thrives in soil too sandy for many of the more valuable varieties to grow.

Glyceria. Of this genus there are several species in this State. They are seldom, if ever, cultivated in this country; but in England some of the species have been cultivated with great success.

G. nervata (Nerved Meadow Grass) was tested in England as early as 1814, with very satisfactory results. Mr. Sinclair states that out of three hundred varieties, this was the only grass that withstood the winter of 1814. As stated before, the grasses of this genus are fond of damp ground, and in this particular they find most congenial conditions in the Coast Range. Specimens of this grass have been collected in the coast mountains measuring seven feet in height. Cattle are fond of the grass, both when green and when made into hay.

Agropyrum glaucum. (Blue Stem.) This is another grass found in the valleys and along streams in this State, but is not confined to these locations. It is a valuable grass for both hay and pasturage. The grass spreads by means of underground stems; and when set in a meadow it is a good practice to break up the roots every two or three years with a sharp harrow. The broken roots or stems will take new vigor, and soon present a stronger growth than the parent plant. In many of the Western States this grass is one of the most valuable for pasturage, but we do not know to what extent it is valued in this State.

Panicum. (Barnyard Grass, Crab Grass, Texas Millet, Red Top.) These are some of the common names applied to various species of this genus. The genus contains a large number of species, which are found in this country, and in this State. Only five are given in the list; but this is probably only a portion of those which could be collected in Oregon. This grass seems to thrive best in the Southern States, where it is used for both hay and pasture. The native species are of less value than those which have been introduced.

Danthonia. This is a genus of which we have given three species in the list. It is of some value as a pasture grass, and is found in poor clay soils and on the barren hills and mountains. We have seen it growing high up on the barren hills of the Cascade Range. It has one good quality, and that is, of growing where other and better grasses will not. It is commonly called wild oatgrass.

Arrhenatherum avenaceum—a long name and a tall grass. (Tall Oat grass; Lincoln Grass; Evergreen Grass.) This is a grass introduced from Europe, and widely distributed throughout the United States. It is being grown in many localities in the State of Oregon, with very gratifying results. It does well upon the white land of the Willamette Valley, where the land has been drained. It sends its roots deep into the ground, thus enabling it to withstand extremes of dry weather. It grows all winter, in the valley furnishing abundant pasturage. When grown for hay it is ready to cut early in the season. The quality of the hay is excellent when the grass is cut in season

and the yield is good. This is a good grass to sow with others for woodland pasture. After the land is burned off, this grass seed will take very readily if slightly covered with a harrow or rake. Its chief merits are that it starts early and maintains its growth when many of the finer grasses will die from lack of moisture.

Trisetum subspicatum. A perennial grass found at high altitudes in mountainous regions. It varies in its growth, according to the conditions by which it is surrounded. The culms vary from three inches to two feet in height. It is said to be very nutritious, but is seldom found in sufficient quantities to be of much value.

Deschampsia. (Hair Grass.) Of this genus there are several species, but the most common, and probably the most important in this State, is *D. cæspitosa.* This is one of the common bunch grasses found in the eastern part of the State. It grows at very high altitudes. Dr Vasey speaks of the grass as follows: "It grows in bunches, which are firmly rooted. The culms are 2–4 feet high. The root-leaves are very numerous, long and narrow. The panicle is very handsome, presenting a purple and glossy hue, and a loose, graceful appearance. Its culms are too light for hay-making, but the abundant root-leaves may make it valuable for pasturage, especially in the arid districts."

Holcus lanatus. (Velvet Grass; Mesquite.) This is a grass which scarcely needs an introduction, to the Oregon farmer, for it is so widely distributed it has become well known. It is a grass introduced from Europe, but is quite thoroughly naturalized. It is inclined to grow in bunches, and does best on low, wet land; yet it is found on all kinds of soil in Oregon. It is quite a favorite pasture grass in the red hill lands where fern abounds. It seeds readily, and withstands extremes of drought better than most grasses found in these localities. The grass has done well, as far as we have tried it, on the white land. Its chief value lies in its power to thrive where other and better grasses fail. Hay made from this grass is inferior to that of most other grasses.

Agrostis. This is one of the largest and most widely distributed genera in the list, and it is one of the most valuable from an economic point of view. It contains several species which are valuable for both hay and pasture. Red Top is the common name by which several of the species are known.

A. vulgaris is extensively sown for both hay and pasturage. It thrives best on wet, swampy meadows, where it makes a thick, firm sod which resists injury from tramping better than most any other grass.

A. stolenifera, a variety of *A. canina*, produces the best turf on white land of any seen growing on such land. It produces an abundance of fine leaves and stems, which make excellent pasturage for both sheep and cattle. We believe that this grass will become a valuable pasture grass for the prairie lands of the Willamette Valley. The discussion of this valuable genus might be profitably extended much further, but we will be content with saying that, on the whole, the grasses of this genus are among the most nutritious and widely distributed grasses of the State.

Calamagrostis. Of this genus there are four species named in the list, all of which are more or less valuable for both pasturage and hay, as we mentioned in the outset. Cattle men report having found this grass in abundance in the

eastern part of the State, where it furnishes a most nutritious food for stock.

Beckmania enocœformis. (Slough Grass.) This grass is found in marshy ground in Oregon and California. In some localities it is found in abundance, producing a valuable source of food for stock when it is young and tender. It is found distributed throughout the Coast Range, especially near the sea coast and along the streams.

Dactylis glomerata. (Orchard Grass.) This is a grass introduced from Europe, which has become thoroughly Amercanized, and is almost a native Oregonian. There is no State in the Union where orchard grass does better than in Oregon. It makes good pasturage, and when cut early can not be easily excelled for hay. It does well on the level lands of the Willamette Valley, and on the red hill land it grows with great vigor. In most parts of Oregon it is desirable to get a grass which will mature early so that it can make its growth before the dry season begins. This grass meets these requirements completely. It begins to head in April, and is often ready to cut in May It continues its growth during the winter, furnishing a good growth for pasturage. If sown alone it should be sown thick; but the best results are obtained when sown with clover or some other grass. In spring this grass will furnish a bite two weeks earlier than most other grasses. When grazed down it soon recovers its vigor of growth. This is one of the grasses which is taking the place of the native sorts, which are gradually disappearing.

Poa. This is a grass which contains the largest number of species and varieties of any named in the list. The Kentucky blue grass is a good type of this genus. It contains grasses varying in height, when mature, from two or three inches to four feet. It contains some of the earliest maturing species, as well as those which grow during the entire season. The little grass (*Poa annua*) found on the road side, on gravely walks and on the lawn, which in Oregon blooms often in March, and I presume earlier, is one of the grasses of this genus.

Poa pratensis. The great blue grass of the Eastern, Southern, and Middle States is found in Oregon, but it does not furnish the valuable pasture here that it does in the States mentioned. Where it has been sown in trial plats, it has not done as well as Orchard grass, Tall-oat grass, English Rye grass, or many of the fescues. When a top dressing of manure has been applied the grass does much better, indicating that the soil was deficient in some of the elements essential to its best development. While we have seen some fine specimens of this grass growing in the State, we are doubtful of its becoming of very great agricultural value.

Poa tenuifolia is one of the bunch grasses which furnishes wild pasturage in many parts of the State. This grass is very nutritious, and is readily eaten by stock of all kinds. Much more interesting data might be presented with reference to the grasses of this genus in this State, but we will be content to say that they are widely distributed throughout the State, and figure more or less prominently in her agricultural resources. They are found high up on the mountains, in the valleys, on the plains and along the coast.

Avena fatua. (Wild Oat.) While this grass is considered a weed, "when out of place," yet it is a source of much valuable food for stock throughout

portions of this State and California. If cut in season it makes good hay, and when growing makes good pasturage. If permitted to go to seed it is difficult to clear the ground of it, for the seed will remain in the ground a long time without germinating, unless the conditions are favorable.

Stipa. Of this genus there are a few species worthy of mention. The most important, and one not in the list, is *S. spartea*, called porcupine grass. *S. cornata* is also found in some parts of the State, and is one of the bunch grasses. It furnishes pasturage of more or less value, although the long twisted awns make it disagreeable to stock. It is also cut for hay, of which it makes a fair quality.

Phleum pratensis. (Timothy.) This is one of the best known grasses in the list, and will need very little comment. It is well known that in many parts of Oregon this grass finds congenial soil and climate. Specimens eight feet in height have been sent in from certain valleys in the Coast Range near the Oregon Pacific Railroad. It is widely distributed and successfully grown in the valleys throughout the State.

Alopecurus. (Foxtail Grass.) A grass especially adapted to low, wet marshes and sloughs. *A. pratensis* (Meadow Foxtail), is perhaps the most common species. It starts early in spring, usually heading out in April in the Willamette Valley. It does not cover the ground with as complete a turf as many of the smaller and finer grasses. The chief value of the grass lies in its use for pasture when mixed with other grasses. Some species are found high up in the mountain meadows, and on account of this the grass is sometimes called mountain timothy. It makes a fair quality of hay, but the yield is light.

Lolium. (Rye-grass.) Of this grass much might be said, for it seems to do especially well in this State. *L. perenne* (English Rye-grass) has won a place among the standard grasses for pasture in some portions of the Willamette Valley. In Washington County it has been grown with flattering success. When sown in the fall it will make a crop the following year. Hay made from this grass, if cut early, is good in quality and it yields well. This species has done better, as far as noticed, than *L. Italicum*, although the latter makes a fair growth; but does not stand so long without reseeding. *L. temulentum* is thought to be injurious to stock on account of the fungus growth of the seeds (ergot).

Much more might be said of the grasses of Oregon, but we have gone beyond our limit already, hence we will bring the discussion to a close by briefly referring to the native clovers.

Trifolium. Of this genus one can scarcely go amiss in the State of Oregon. There are nineteen species and varieties named in the list, and yet there are more which have been collected in this State. To this list of native clovers one might add *T. pratensis* (Red Clover), *T. hybridum* (Alsike), and *T. repens* (White or Dutch Clover). The common red clover is grown in great abundance in some counties in the Willamette Valley, and no better growth could be found in any State in the Union. Farmers are learning to use it more and more as the demand for stock raising and feeding increases. That it can be grown successfully in most parts of the State, there is little doubt. All of the country west of the Cascade Range will grow clover successfully, we believe.

As a good indication that tame clover will succeed we would refer to the native clovers, and as they are closely related to red clover, we believe that this "red plumed knight" will at no distant day hold undisputed possession of the farmers' fields. Up to the present time the farmer has not seen the need of recuperating a soil of almost unlimited fertility; but ere long some means will have to be taken to bring back the waning forces; and as clover carries the keys to this secret, it will have to come forth and unlock the hidden resources of the soil, setting free the forces which produce "first the blade, then the ear, after that the full corn in the ear."

Both alsike and white clover grow vigorously in the Coast Range. They are found in the mountains, foot hills and along the coast. The great difficulty has been to get the seed to catch, but this is being gradually overcome, as a better state of cultivation prevails. Space will not permit a full discussion of the native clovers, but no one will doubt for a moment that they are valuable forage plants, and in this State where they are so widely distributed form an important factor in the natural pasturage.

Closely related to clover, we find alfalfa which is sometimes called clover, (*Mecago sativa.*) This plant thrives in many parts of the State, making an important adjunct in furnishing pasturage and hay. In Eastern and Southern Oregon it is extensively grown, both with and without irrrigation. The loose, open soil of these localities is especially adapted to the growth of alfalfa. It does much better of course where water can be supplied. As high as seven tons per acre have been harvested in a single season, and this on sage-brush land which, at one time, was thought to be worthless. On the heavy lands of the Willamette Valley it is of doubtful value. On such land it is started with difficulty, and it does not grow as well as upon a loose and more open soil.

A discussion of the forage plants of Oregon would not be complete without mention of the vetch and wild pea. There are several species named in the list under the scientific names of *Vicia* and *Lathyrus*. Both of these genera furnish valuable forage plants. The vetch is found in the valleys, but it is most abundant in the mountain pastures. It starts early, producing an early bite for stock, and when dry, during the latter part of the season and winter, it is readily eaten by stock, and is very nutritious. The wild pea is a valuable forage plant in both the Coast and Cascade Ranges. Dairymen living near the mountains prize this feed very highly in the production of fine butter and cheese. Some species of this plant might, no doubt, be profitably introduced on the farms which are located in the valleys and in the foot hills.

Vicia sativa (Common Vetch or Tares), is quite extensively grown for green feed, and for silage; for both of which it is well adapted. The winter variety has done best as far as we are aware.

Mr. Secretary of the State Board of Agriculture, with these brief and desultory notes upon the grasses, etc., herein discussed, we will close, hoping that we have, in a slight degree at least, aided you in your laudable enterprise. Owing to pressure of other duties, and the short time in which we have had to do the work, we do not feel that we have done justice to such an important subject, but we humbly submit our mite, hoping to throw some light upon the unbounded resources of our beautiful State.

Oregon Timber.

Twenty-five thousand square miles of the mountain and coast lands of Oregon are covered by a growth of timber the like of which, in diversity and size, no other similar space on the earth's surface can boast. One can pick his way for miles through these forests, where the ground could not give room for the cordwood of trees felled and worked up. The quantity of timber, near and remote, to and from the Columbia River is simply prodigious. These 16,000,000 acres of forest will yield 50,000 to 200,000 feet per acre. So far as the present generation is concerned, the supply is inexhaustible, assuring the continuance of a great industry which must soon grow to larger dimensions. The varieties of chief economic value are Douglas or Oregon Pine, Yellow Fir, Black Spruce, Hemlock, White Pine, Sugar Pine, Yew, Yellow Cyprus, broad-leaved Maple, Myrtle or Laurel, Dogwood, Arbutus, Aspen, and Cottonwood. The Douglas Pine or Red Fir attains a height of 200 to 300 feet, is straight, and is the red hickory of America. The French experts at the Toulon dockyards reported: "The masts and spars are woods rare and exceptional for dimensions and superior qualities, strength, lightness, and absence from knots and other grave vices; they may be bent and twisted several times in contrary directions without breaking." Lloyds, the English builders, report of it: "We have tested all the woods in the world and find the red fir the best."

Forest Trees

OF ECONOMICAL VALUE FOR WOODS OF COMMERCE OR FOR SHADE.

By Thomas Condon,

Professor of Botany in the State University of Oregon, and State Geologist.

There are two directions in which economical botany may find with the public special interest: one, the need of timber for commerce, and in manufacture; the other, the home demands for shade trees and landscape gardening. For both of these lines of demand, that Oregon is well endowed may be seen in even a brief enumeration of the native trees suitable for these objects.

THE PINES.

Beginning with the demands of our market, we place first on our list of timber the pines. The principal of these is the Sugar Pine (*Pinus lambertiana*). It is at home along the northern slopes of the Siskiyous, is fairly abundant along the line of the Oregon & California Railroad near Grants Pass. It is also very fine and very abundant on the foothills of the Cascades that overlook Klamath marsh. The timber is not inferior to that of the White Pine of the eastern slope of the continent. The tree is large, often growing to a height of 150 to 175 feet. It bears a large cone, often fifteen to seventeen inches in length, suspended from the extremities of the limbs, and therefore scattering. The timber of this Sugar Pine is highly prized for finishing, scarcely distinguishable from the best Eastern White Pine.

Another pine, the *Pinus ponderosa* (Oregon Yellow Pine), flourishes in many regions; a good marketable timber in and out of Oregon. It is abundant in Central Oregon from The Dalles along the eastern slopes and foothills of the Cascade Mountains and southward into Lake County. It is met with seldom in the Willamette Valley and is there of inferior quality for timber. Farther south one meets it more frequently. It is quite abundant on the eastern slopes of the Cascades throughout Oregon and Washington, and in many places is so fine a timber that its boards are equal to the best of any market. The supply of this timber in Eastern Oregon is very great.

Pinus contorta (Black Pine) is abundant along the coast, along the eastern slopes of the Cascades, and on the more elevated of the plains beyond. It is a small tree, used for fuel, but is of very little value for timber or for dressed lumber.

Pinus tuberculata (Tuberculated Pine) is only found on the mountains, is a small tree of but little economical value. It is remarkable for its habit of retaining all of its old cones attached to the body of the tree. Small groves of this tree may be seen on the upper slopes of the Siskiyous and in many places on the Cascades. It rarely reaches the height of sixty feet; its cones, six inches long, never open of their own accord to show their seeds, as do other pine cones.

Pinus muricata and *Pinus sabiniana* are rarely found in Oregon.

THE SPRUCES.

A good deal of confusion of names has fallen on this group of trees, not only in the popular names they have received but in the scientific as well. The American R. R. surveys in their reports of our forestry named the trees of this group having pendant cones, *Abies*, and those bearing upright cones, *Picea*. The popular names Spruce and Fir make their synonyms. The popular maintenance of this distinction became easy. Inasmuch as a popular description of their place in economical botany is what is here attempted, we will retain this distinction of the R. R. surveys and call those bearing pendant cones, Spruce; all bearing upright cones, Fir; the former *Abies*, the latter *Picea*.

1. *Abies Douglasii* (Douglas Spruce.) Popularly and especially in the lumber market, this ought to be called Douglas Spruce. In Oregon and Washington we have it in two varieties—"Red Fir" and "Yellow Fir." The yellow is a fine-grained wood, and its boards are often as smooth as pine, while the red variety is more stiff and splintery. But red or yellow, this fir is one of the grandest trees of the continent, and one of the most important to commerce. For spars, for bridges or for framing for buildings, its strength and great length make it the first in the market. Its great abundance and rapid growth ensure a long continued supply. Douglas Spruce will raise more commercial timber to the acre than any other tree on the continent.

2. *Abies Menziesii.* (Menzies Spruce, or Tideland Spruce.) This fine forest tree is seen in its best condition along the coast, where it often reaches the height of 100 feet or more. Its lumber is soft and heavy and coarse, but is so tasteless and odorless that it is found to be the best material for barrels and

boxes for packing, and for these purposes is now finding a wide market. It is a handsome ornamental tree and easily transplanted.

3. *Abies Canadensis; Tsuga Canadense.* (Hemlock Spruce.) In any country less favored in commercial timber the hemlock of our mountains, or that of our coast, would rank well It reaches its finest growth in Tillamook county. The young trees are graceful ornaments in landscape gardening, and are easily transplanted.

4. *Abies Williamsonii.* (Williamson's Spruce.) A handsome tree of elevated mountain habits, and so out of reach of present commercial demands. All these spruces have pendant cones.

THE PICEAS — FIRS.

The cones are upright, and in the distance they are sometimes mistaken for birds perched on the limbs.

1. *Picea grandis* (Western Balsam Fir), or *Abies grandis* (Oregon White Fir.) This tree is found at its best along the banks of the Willamette River and its tributaries, but is widely dispersed along the mountain slopes of both ranges. Its commercial value falls below that of several other trees. It is conspicuous along our river bottoms for height and beauty. It is easily transplanted.

2. *Picea noblis.* (Noble Fir.) This fine fir is at home in places remote from mills and railroad lines, and therefore does not figure much in commerce. Extensive groves of it may be seen among the Coast Mountains where prostrate trees 200 feet in length are not rare. As an ornamental tree it well deserves its name of noble, and is easily transplanted. It also has a large handsome cone.

3. *Picea amabilis.* Cones are dark purple. This, too, is out of the reach of commerce; abundant along the summit of the Cascade Mountains. This also is a very handsome tree for landscape gardening.

CEDARS

1. *Thuga gigantea; Western arborvitea.* This is the White Cedar of North Oregon and of Washington. It is a grand specimen of the forest tree; is durable, easily worked as finishing lumber and highly prized for its lightness. The northern Indians build their largest canoes of it, and use its bark for mats and cordage. In the southern portion of the Willamette Valley it is called the Smooth-barked Cedar, to distinguish it from *Libroccdrus.*

2. *Libroccdrus decurrens.* (Rough-bark Cedar or Insence Cedar.) As a tree for lumber this is inferior to the *Thuga.* It does not grow farther north than Lane County. It is abundant throughout Douglas and Jackson counties.

3. *Cupresseos lawsonina* (Cypress), *Chamaccyparis lawsoniana* (Port Orford Cedar). This tree is not found north of the Umpqua River. It is at its best around Coos Bay and the Coquille River and the north slopes of the Siskiyous. It is called White Cedar; is shipped extensively for the California market. So completely marketable is this tree that one may see on the Coquille the finest example of lumber economy. The log is cut into boards and squared timber, the slabs into pieces for broom handles and lath, and the scraps into blocks for

matches; and it deserves this fine economy of material. As a tree for landscape gardening it is questionable whether North America has a finer tree than the Port Orford Cedar. It is at its best along the northern slopes of the Siskiyous. It is easily transplanted, and will grow in a wide range of climate, and will teach any one to love a tree.

JUNIPERS.

Juniperus occidentallis. In many of the dryer regions of Central Oregon this Juniper, under the name of Cedar, furnishes the chief and often the only supply of firewood. It is not abundant enough for extensive commercial demands. It strongly resembles the Red Cedar of the Eastern States—*Juniperus Virginianus.*

Juniperus communis. A stranger to this species seeing it for the first time experiences marked surprise. It is entirely prostrate, often growing over a space of one hundred feet square, the stem five or six inches in thickness. One could readily imagine many situations in landscape gardening in which such a plant would fill a want. It is often met on the coast.

THE OREGON YEW.

Taxas brevifolla. The Oregon Yew has a dense, durable wood, often used in Western Oregon for fence posts. It is not abundant enough for commercial purposes. It is a handsome tree, pays for transplanting in the beauty it adds to a lawn.

THE OREGON LARCH.

Larix Occidentallis. (Western Larch.) This is a much larger tree than the Tamarack of the Eastern States. Its timber is good. It is at home along a belt of foothills from the Upper Des Chutes north into Washington Territory and abundant in the Blue Mountains, but not in Western Oregon. Except this Larch, all the foregoing trees are evergreen.

We will now consider the deciduous trees that rank as valuable for shade or ornament as for commerce. Oregon has three Oaks that are of commercial importance. Of these in abundance and quality, the Oregon White Oak ranks first.

THE OREGON OAKS.

1. *Quercus Garryana.* (Oregon White Oak.) This seems at its best in the Willamette Valley and along the Columbia River. For years past a large amount of this timber has been shipped to San Francisco, and well authenticated cases have occurred of its being returned to Oregon as Eastern Oak, for our wagon-builders.

2. *Quercus Kelloggii.* (Black Oak; Kellogg's Oak.) This handsome Oak is found no farther north than Lane County, but grows abundant in Southern Oregon. I have not seen it in Central Oregon. It is at its best in Douglas and Jackson counties. It is a much handsomer tree than the White Oak, but its timber is not so good.

3. *Quercus chrysolepis.* (Live Oak.) This tree is often used for wagon timber along the western slopes of the Siskiyous, but is scarcely abundant enough to more than supply home want.

FOREST TREES

WHOSE TIMBERS HAVE SPECIAL FITNESS FOR THE CABINET SHOP—THE OREGON BROAD-LEAVED MAPLE.

1. *Acer macrophyllum.* (Oregon Broad-leaved Maple.) The wood of this tree is dense and handsome, polishing well, with a rich variety of grain. For household furniture it is a valuable material. As a shade tree it is superior. It grows rapidly, transplants easily, and if left to itself forms a handsome head.

Acer circinatum. (Vine Maple.) As its name indicates, it is too small for anything larger than barrel hoops, for which purpose it is sometimes sent to San Francisco.

OREGON ASH.

2. *Fraxinus Oregona.* (Oregon Ash.) This ash is abundant along the streams of Western Oregon, sufficiently so to give it a place as a wood of commerce. Specimens of it may be seen in our cabinet shops that will vindicate this claim. The United States Custom House at Portland is finished inside with Oregon Ash. It loves moist places, and is on this account not suitable for shade or ornament.

OREGON ALDER.

3. *Alnus Oregona.* (Oregon Alder.) The Oregon Alder is abundant along the stream beds and other damp places. So marked is its love for springs and streams that the presence of a clump of these alders will often reveal to the thirsty explorer a spring of water. Its trunk is often two feet through. Its wood is often used in our cabinet shops, where it is prized for inside work, such as drawers.

OREGON MYRTLE.

4. *Oreodaphne Californica.* (Oregon Myrtle; California Laurel.) This handsome, fragrant tree is abundant along the Umpqua River and through Rogue River Valley. It is at its best around Coos Bay, where it is shipped to San Francisco. As it is so heavy that it will not float in water, it is difficult to bring this wood to market. It is durable and is susceptible of a fine polish, and in every respect is a wood to be prized in commerce. As an ornamental tree it is highly valued, but is difficult to transplant. Its fruit is fairly abundant, and may be raised from the seed.

THE OREGON LAUREL.

5. *Madrona, Arbutus Menziesii.* (Oregon Laurel.) The Madrona is frequent in Jackson County and occasion in the Willamette Valley. For purposes of commerce it is not abundant enough, but for limited home supply it is a handsome, dense, close-grained wood that bears a good polish and is durable. As an addition to the lawn or door-yard it is a real ornament, resembling the European laurel.

THE DOGWOOD.

6. *Cornus Nuttalii.* (Dogwood.) This tree is ordinarily too small and too seldom met to be of any importance to Oregon commerce. But its wood is a

very handsome one for furniture or parts of furniture requiring narrow boards. It often grows to be twelve or fifteen inches through and is capable of a high polish. In all respects it is a fine wood for the turning lathe.

THE COTTONWOOD.

7. *Populus trichocarpa; Populus balsamifera.* (Cottonwood.) This tree is very abundant along the rivers and smaller streams and often reaches a large size. Recent experiments in making paper from the fibers of this wood have been so successful that there is but little doubt of its future importance. This wood is soft and its fiber so silky as to insure the best results for paper making.

WILD CHERRY.

8. *Cerasus Mollis, Prunus emarginata* (variety *Mollis*). (Wild Cherry.) In the Willamette Valley this tree is often in small groves of slender, straight forms, eight to ten inches through; more seldom one finds a single tree twelve to eighteen inches through. Its wood is a handsome smooth material for furniture. In the Coast Mountains it is often seen in groves of considerable extent of long, straight and slender poles.

AGRICULTURE.

"Oregon affords a vast area of farming lands, the best conditions to warrant the production of heavy crops, and a climate above all others, enabling the husbandman to work out doors at something every month of the year. In its proportion of productive to waste lands, it will compare well with the average countries of similar extent. In soil, or climate, or in any other condition affecting the growth of crops, the comparison would be vastly in favor of Oregon. The fact is, there is but little land in this vast region that is not good for something, being adapted to either wheat, barley, oats, hay, hops, pasture, vegetables, fruits, timber, or mining. In many sections the grass is green the year round. The farmer can seed all the fall until Christmas, or all the spring from February to May. Harvest is continued just as long as the grain will stand."

Mr. B S. Pague, Superintendent of the Oregon Weather Bureau, submits the following statement, which is perhaps the most accurate of any which has heretofore been made:

The Oregon Weather Bureau has for the last four months been extensively engaged in collecting statistics of all the crops produced in this State last season. It has so far received over 3,000 reports, which cover almost every election precinct in the State. The reports are now being compiled, and the following figures relative to Oregon's wheat product are furnished: Clatsop County has the highest average yield of bushels to the acre in the State, that of 36.8, although the reports represent only 180 acres. Wasco County on the other hand, with reports from 25,000 acres, has the least average yield, that of 11.7 bushels per acre. In the counties where irrigation is used to some extent for the raising of crops, as Malheur and Harney, the returns show a remarkably high average yield, 31.8 and 30.5 bushels, respectively, per acre. Among the

valley counties Polk has the highest average yield, that of 26.7 bushels, while Lane registers the least at 19.2.

The following is a list of the different counties throughout the State, showing the acreage under cultivation and the average yield of bushels to the acre:

County.	Acres under cultivation.	Average yield per acre, bushels.
Umatilla	87,216	20.7
Union	28,503	22.2
Wasco	25,600	11.7
Wallowa	6,812	28.5
Morrow	37,192	24.4
Multnomah	1,045	25.9
Sherman	41,850	18.4
Tillamook	21	20.8
Malheur	1,438	31.8
Clackamas	36,510	24.3
Benton	18,359	23.1
Lane	21,928	19.2
Linn	44,912	22.4
Marion	52,350	23.0
Polk	53,977	26.7
Yamhill	67,811	25.6
Washington	16,610	24.5
Gilliam	13,474	24.0
Harney	4,489	30.5
Jackson	9,594	21.0
Josephine	3,680	18.0
Douglas	38,745	16.4
Crook	3,098	22.3
Coos	2,571	27.2
Curry	159	30.9
Clatsop	180	36.8
Baker	2,418	28.8
Grant	5,625	24.0
Lake	860	23.0
Klamath	6,965	17.5
Columbia	908	29.3

This makes the average yield in wheat from the thirty-one counties in the State of Oregon to be a little over 15,000,000 bushels, and the average yield per county of twenty-four bushels per acre. The total acreage of wheat in Oregon in 1891 from these figures amounts to 634,894 acres.

An impression seems to prevail that agriculture in Oregon is confined to growing wheat. This is as far from the truth as to suppose that Missouri's product is confined to corn and hogs. In Oregon the farmer raises wheat, oats, barley, rye, buckwheat, flax, hay, potatoes, hops, rutabagas, and almost every kind of vegetable that may be mentioned. In the southern and southeastern parts of Oregon corn is raised to a large extent, and of a superior quality. While in the matter of wheat Oregon stands at the head of the National class, she stands with but few equals in relation to fruit and other productions mentioned. The area devoted to flax and buckwheat is not large, but is steadily increasing. Relative to the production of the sugar beet, the Oregon Experimental Station at the State Agricultural College says: "In the matter of climate and soil, our State compares favorably with foreign centers of beet culture. The subject of temperature with reference to the sugar beet has been very carefully studied by Dr. McMurtrie, who has constructed his mean isotherm for beet culture at 70° F. for June, July and August. For Oregon this

line would include Clatsop, Columbia, part of Tillamook, Washington, Yamhill, part of Polk, part of Linn, Marion, Clackamas, Multnomah, Wasco, part of Crook, Sherman, Gilliam, Morrow, Umatilla, Grant, Union, Wallowa, Baker, part of Harney, and Malheur A large portion of this area given as favorable to beet culture lies in the eastern and southeastern parts, and because of the peculiar climatic conditions there existing it will be essential to study the subject of irrigation before definite results can be had for those portions of the State. There are many localities lying outside of the indicated belt north and south where doubtless the sugar beet will be found to thrive. This has already proven true in some instances, since the best showing has been made in Southern Oregon, where analyses of ten lots show an average of 13.95% sugar in the juice, while in the Willamette Valley the average of sixty-nine separate analyses gave an average of 13.38% sugar and an average beet of a little over one and one-fourth pounds' weight."

The garden vegetables produced in Oregon embrace all the ordinary varieties known to the table, and their growth as well as their flavor cannot be excelled. It has long since been demonstrated that Oregon is one of the best if not the best fruit-growing States of the Union, and the beauty and flavor of her orchard products have never been surpassed. [See the article on fruit culture.]

WHEAT.

Wheat is the staple agricultural product of Oregon. Its superior quality has made it famous in the grain markets of the world, and secures for it the highest price. The yield averages, as above stated, twenty-four bushels per acre. The berry is full and heavy, often exceeding by five to nine pounds the standard weight of a bushel (60 pounds).

OATS.

Oats also yield heavily—from forty to seventy-five bushels per acre. The standard weight of a bushel is thirty-six pounds, but the weight of forty and forty-five pounds to the bushel is not infrequent. Rye and Barley are likewise profitably raised.

HOPS.

Hops are an important product. They are grown on the river bottom lands, and with proper cultivation a large yield of superior quality is obtained. The yield runs from one thousand to three thousand pounds per acre. The principal yards are at present in the Willamette Valley, but the acreage might be profitably increased ten fold, as the crop readily sells at prices ranging from fifteen to twenty cents per pound, and sometimes from fifty cents to one dollar. Some of the advantages of this industry are the certainty of a good crop, the early bearing of the vines, the abundant yield, the low cost of production, the facilities for procuring suitable soil, poles, fuel for drying, and cheap labor for picking, Indians being largely used. The quality is only second to the best grown in New York, which are the finest in the country.

FLAX.

Of recent years Flax has been raised for export, and its cultivation is a permanent industry. It is not unusual to obtain from four hundred to eight hundred pounds of clear fiber per acre. In one neighborhood in Oregon more than ten thousand bushels of flaxseed were raised in one year, which netted the producers as many dollars.

STOCK RAISING.

"Oregon has been for years the great cattle center of the Pacific Northwest. Is is also noted for its production of horses and sheep. The mild winter climate, the fact that the native grasses remain green during most of the year, and the ease with which the cultivated grasses can be raised, make Oregon an excellent country for the growth of every kind of stock. The general practice of Western Oregon farmers is to provide fodder for only a part of the year, during the balance of which the stock roam at large, while in Eastern Oregon vast numbers have never tasted prepared food. During the cold weather, which is occasionally experienced in winter, live stock suffers sometimes, but as a rule it does well enough in the open air all the year. Bunch grass furnishes all the elements of nutriment necessary for bone, muscle and flesh. It is as strong as oats or barley, and in its perfection will supply the animal with as much nourishment in a day as the quantity of timothy, clover or hay it may eat in the same time, with the usual amount of grain added. The animals fed on this bunch grass are well rounded, hard and solid in flesh. In bunch-grass pastures rye grass grows on lowlands and hillsides. It makes excellent hay when well cured, and yields heavily. Stock will not eat it on the range, however, except when severe winters come; then they pass through the cold weather nicely on the long stems that stand above the snow. All through the bunch grass region the smaller grasses cover the ground between the clumps of larger growth. The stock ranges of Baker, Malheur, and Grant Counties in Eastern Oregon are among the best in the West. Cattle have grazed in some of these valleys for twenty years without other food than that obtained by them on the ranges, and have never suffered serious loss. Running water is abundant in the streams, fed constantly by living streams and melting snow of the mountains, hence stock does not suffer for lack of water during the driest season. The largest owners of horned stock are improving its quality by infusing fine blood into the herds. There are numerous breeders of Short-horns, Galloways, Polled Angus, Ayrshires, Herefords, Holsteins, Alderneys, and Devons of pure race. This large introduction of fine blood into the cattle herds of Oregon will soon wonderfully increase their value, and greatly add to the profits of the business."

The Dairying Interests of Oregon.

By Hon. Thomas Paulsen.

Since I contributed an article on this subject four years ago, there has been a marked improvement in the quality as well as increase in the quantity of dairy products of Oregon; but notwithstanding there is no doubt that the dairy industry is as yet but in its infancy here, Oregon, and especially the western portion thereof, is as well if not better adapted to profitable dairying than any other State; but nevertheless, a large portion of the dairy products consumed in our State are still imported from other States.

Great improvement in the methods of dairying is made possible by a more thorough and expeditious separation of the cream and milk, and as a machine (separator) for this purpose can now be obtained for one hundred and fifty dollars, suitable for a dairy of twenty-five or thirty cows, the cost of producing butter can be reduced considerably, the quality improved, and the quantity increased. This is especially favorable to our State, as owing to our sparse population and the condition of our roads during our rainy season, creameries which can afford to employ expensive machinery have not been, with few exceptions, successful here, notwithstanding the natural advantages of our equable and mild climate, so favorable to dairying. Machinery that will thoroughly and expeditiously separate the cream and milk, if obtainable at a reasonable price, will enable the farmer to overcome the disadvantage of a scarcity of ice, which in Western Oregon cannot be procured, if at all, at a cost that would allow its use in the dairy, and, in connection with silo, will make dairying one of the most profitable branches of agriculture in Oregon.

Sweet corn, which is superior in value to field corn as food for milch cows, especially when used for ensilage, can be grown in Oregon as readily as anywhere, and in connection with a moderate grain ration will make winter dairying especially profitable here, as the demand always exceeds the supply for good butter during the winter. The belief existed for some time, and many farmers still think so, that clover could be grown profitably only in a few favored localities of Oregon, but experience has shown that the climate as well as the soil of our State in most localities is well adapted to the growth of clover; and clover, either fed green or made into good hay, is one of the best foods for dairy cattle. The time has gone by when a man could turn his milch cows on the commons and expect any profit from them; but anyone who will take advantage of the natural adaptability of the soil of Oregon for all varieties of grass (and when I say grass, I include all varieties of clover), can, by an additional and liberal supply of good corn ensilage for winter use, make dairying a success here.

By C. H. Schmidt, B. S. A.

Before we can intelligently form an opinion regarding this vast industry, which now stands as the greatest by far of all agricultural industries in the United States, returning a yearly earning to our farms of over eight hundred

million dollars, we must briefly consider the conditions under which we are living and working in this State. It is not only our soil, water and climate which must be favorable, but the markets for the manufactured products are an essential feature to either encourage or discourage the industry. Nor is that all; the very great importance of a full understanding of all those factors which go to make up our environment are of equal importance. Again, we are called upon to consider other questions which indirectly have their bearings upon the industry. Such questions, for instance, as how to preserve and improve our soil's fertility demand our earnest attention, and can be answered to the fullest satisfaction by dairy husbandry. To do full justice to the dairy industry of our State, we must take into full consideration the above conditions; and after careful review we will realize that dairying, especially winter dairying, is entitled to the first place of all industries in the State of Oregon.

SOIL, CLIMATE AND WATER.

Not only is our soil, climate and water especially well fitted for modern dairying, but we undoubtedly have the best home market for fine dairy products in the United States. Sixty, seventy, and frequently eighty cents per roll (two pounds) for fine butter, are common prices during the winter months in Portland, and twelve to fifteen cents for choice cheese.

EVOLUTION OF THE DAIRY INDUSTRY.

The production of an abundance of cheap and rich food suited to dairy stock is essential for successful and profitable dairying. It must be strongly set forth, that the feed must be provided from the dairyman's *own acres*, and not from the feed store, and this question has often perplexed the amateur dairyman. As the birthplace of successful dairying is in Northern Europe, especially along the North Sea and the Baltic, where grasses and clover were the main crops, it has been supposed that a dairy country was only in its right place where abundance of permanent grasses and clover are easily obtained. This view has also prevailed in this State until recent years, and therefore it finds a natural explanation, that dairying in this State has almost entirely been confined to localities bordering on the rivers or the ocean, and the lower valleys. In consequence of this natural course, dairying has been carried on only during the grass period, while in the winter the cows would be dry. This system is identified as summer dairying, and was a dozen years ago the leading system in practice throughout the United States. Butter was held from grass period until grass came again, and the milch cows would give milk only six months of the year. Wonderful changes have been going on in the Eastern States since then. Dairy knowledge came to the assistance of the practical dairyman, dairy associations sprang up, dairy schools were fostered, valuable aid came from the experimental stations and the farmers' institutes, and the dairy press visited the farmer in every locality. The result has been a revolution, and has created a remarkable prosperity wherever dairy knowledge found its way. This same march of progress has commenced in Oregon. Also here will King Wheat give place and his crown to the gentle butter cow. Dairy knowledge changes summer dairying largely to winter dairying, because it is

much more profitable. While summer dairying may be called a natural system, depending entirely or mainly on the grasses, and returning, in the primitive way in which it is carried on, only a small profit, winter dairying may justly be termed an artificial system, and very profitable, entirely independent, if necessary, of grasses and the grass period, relying on easily-grown crops and forage plants, such as corn (for silage), green oats, vetches, peas, clover, alfalfa, and other plants. It is an easy matter for the Oregon feeder to have an abundance of cheap, succulent feed for his stock summer and winter, and much cheaper than he can have grass. Permanent pastures are at best expensive and uncertain, and are not profitable in many places, except on low untillable river bottom land. A family can, by this system, make a good living on less than fifty acres, and there is no difficulty in keeping a cow to the acre on well tilled, fertile land in Oregon.

INTRODUCTION OF WINTER DAIRYING.

While summer dairying conducted in a thorough manner is reasonably profitable in Oregon, it is especially winter dairying which offers such great inducements to the future farmer of the Pacific Coast, particularly to the Oregon farmer of to-day and in time to come. Hundreds of tons of butter and cheese are imported every winter to this coast; in fact, nearly all the butter and cheese used in the winter months are imported thousands of miles from the Eastern States; and taking into consideration also the large market we have in the mining camps and in adjoining States, it may be safely said that we have an almost unlimited home market. Our home market calls for dairy products, within a few hundred miles, to the enormous sum of fifteen million dollars annually, with a population probably only a fraction of what it will be a few years from now. Should we ever reach the point when we can do more than supply the home market, which now seems doubtful, we can have an easy outlet for our surplus. There has never been over-production of fine butter in the winter months anywhere in the world; in fact, there has never been near enough fine butter to meet the demand in the winter, and the vexed question of over-production can be lost sight of in this industry.

WHERE IS THE FIELD FOR WINTER DAIRYING IN THIS STATE?

The field is not limited by any means. Nearly everywhere on the tilled land good crops of either oats, wheat, corn, clover, alfalfa, vetches, or grasses are grown. Any of those crops can, in connection with other feed, be profitably turned into butter and cheese. Corn may be termed as the king for winter dairying, same as grasses used to be for summer dairying, and where corn grows easily, as it does nearly everywhere on the tilled land in Oregon, it forms the cheapest food, as corn silage, in the winter. Again alfalfa, clover, oats, and vetches in some localities are competing with corn. It is by no means the valleys alone which are natural homes for the gentle butter cow. Word comes from all counties where there is tilled soil, that corn grows fine; that oats is a splendid crop; that clover flourishes; that alfalfa grows to perfection; that grasses are unsurpassed. These statements can easily be verified.

COMPARISON WITH DAIRYING IN THE EASTERN STATES.

The production of fine dairy products, especially fine winter butter, is a profitable industry all over this broad land, where suitable crops can be grown and where there is dairy knowledge, but a great deal more so in Oregon than East. Our soil is much more fertile than the average soil east of the Rockies; and where they grow ten tons of feed East it is safe to say that the same care in cultivation and manuring will bring fifteen tons in Oregon. Again, our moderate climate does not require ice in the summer, a very considerable saving over the Eastern States whose warm summers make it indispensable. These special features, combined with a splendid market close to the producers' doors, cannot fail to become great factors to our future population. There are a few peculiarities incident to our climatic conditions and environments which should not be lost sight of in transplanting dairy ideas from the Eastern States. The success of a creamery in Oregon depends largely upon the necessary milk produced in the immediate vicinity of the creamery. The private dairy, relying mainly on its own production of milk, is more particularly to be encouraged here than in the East, especially since the introduction of the modern baby cream separator.

DRAWBACK TO THE DAIRY INDUSTRY OF OREGON.

We acknowledge only one drawback, and that is lack of dairy knowledge among our farmers and their children. The dairy industry will be worth over $25,000,000 annually to Oregon in a few years if vigorously encouraged. Our farmers have as yet had but little opportunity to learn the modern dairy industry. We are in great need of a wide and general diffusion of solid dairy knowledge. We need earnest and competent men, employed by State institutions and private associations, to devote their whole time to advancing the dairy interest, to put absolutely needed dairy knowledge within the reach of our farmers in every county. We are engaging in a new industry, the most powerful, the most profitable and the most certain in the age of progressive agriculture—an industry closely associated with art, skill and science, and a promoter of health, intelligence and prosperity.

THE SALMON INDUSTRY OF OREGON.

By Hon. F. C. Reed, Chairma Oregon Fish Commission.

The Columbia is noted for its abundant supply of the finest quality of salmon the world has ever produced; and a few facts in regard to this industry at the present time, as well as what may be reasonably expected from it with proper care and attention for years to come, may be of interest to the readers of this article. These remarks will be confined entirely to the Oregon side of the Columbia River and other streams and bays of Oregon. Up to the present this industry has been principally confined to the packing of salmon in tin cans containing from one-half pound to two pounds each; these are shipped to the markets of the world. The season for packing salmon begins on the tenth of April and closes on the tenth of August. During the season of 1891 there

were twelve factories engaged in this business, valued at $200,000, with a cash capital of $900,000; the total output, which is a fair average for the past four years, being 245,550 cases, each containing four dozen one-pound cans, or equivalent to this where other sized cans were used. The packers received an average of $5.50 per case, which would make the total for the twelve factories, $1,350,525. They pay out for material each year about $500,000, and for labor, $400,000.

The salmon are caught by means of gill-nets, round-nets, traps, seines, fish-wheels, and dip-nets; the greater part of them being caught by gill-nets. These nets are made from the best flax or linen thread, similar to that used by shoemakers, by taking twelve parts of shoe-thread and twisting them together, giving them ten or twelve turns to the foot. This makes a very strong twine, capable of sustaining from sixty to seventy pounds' weight. The nets are knit by the fishermen, and when ready to put into the water are about three hundred fathoms long and four fathoms deep, the meshes being about nine inches when extended, or four and a half inches square. With proper care a net will last two seasons. These nets are used as all or any floating gill-net, by drifting with the current, and are managed by two men in large boats, which are twenty-four feet in length, seven to eight feet beam, and twenty-eight inches deep. The fishermen nearly all own their own nets, but many of them rent a boat for the season. They receive one dollar each for the salmon delivered at the factory, and more than $500,000 are annually paid out to them for their labor.

The pound-nets are the same as are used on the Great Lakes in catching white-fish. The traps are much like the pound-nets, except where twine or wire netting is used on the pound-net, on the trap wooden slats are used, being placed near enough together to prevent the salmon from going between them. The seines are the same as used elsewhere, being from two hundred to four hundred fathoms long and eight to ten fathoms deep in the deepest part. Horses are used in hauling them ashore, taking from six to ten horses, according to the size of seine. The fish-wheel—which is only used in very swift water, in the vicinity of the Cascades and the Dalles of the Columbia—is without question the most ingenious contrivance for catching fish ever invented. They are of two kinds, known as the stationary, and scow-wheel. The stationary are constructed at suitable points on the bank of the river, by erecting a frame-work of heavy timbers, called gins, about eight feet apart, and the wheel is hung between these gins by powerful tackles, so it can be raised or lowered as the water rises and falls in the river. These wheels are from twenty-four to thirty feet in diameter, and six to eight feet wide, having three large buckets or dips made of heavy galvanized wire net; and as the wheel is revolved by the strong current, the bucket, or dips, one of which is in the water all of the time, scoop or dip up any fish that may be trying to pass through on their way up stream; and by means of shutes near the axis of the wheel they are slid into boxes at one side. The scow-wheel is the same as the stationary, but is fastened on one end of a large scow which is moored by strong cables at a suitable place in the river, and where stationary wheels could not be constructed. When either of these wheels is let down into the

water, it begins to revolve, and continues to do so until it is hoisted up, the only requirements being a little oil for the bearings and a sufficient force of men to take care of the fish. Before the wheels were invented, the only way salmon could be caught in the rapids was by the old dip-net; and by this primitive mode eight men have dipped out as many as fourteen tons of salmon in twenty-four hours.

As the different modes of catching the salmon have been described, it will not be out of place to say a few words in regard to the different varieties of salmon caught and the season of each. The Chinook (*Oncorhynchus chonicha*), often called Quinnat salmon, begin to enter the Columbia River early in January, and continue to come until the first of August. These are the finest salmon known as to quality and not far inferior as to size, some having been caught that would weigh eighty-five pounds, and those weighing fifty and sixty pounds being a daily occurrence; and the whole season's catch averages twenty-five pounds to the fish. These are nearly all packed in tin cans and are the world-renowned "Columbia River Salmon." The Bluebacks (*Oncorhynchus nerka*) are the next best variety for packing in tins. They are a small fish, weighing about four pounds each, the flesh being very red and of a delicious flavor, but not so rich as the Chinook. They come into the river about the middle of April and continue until the middle of July.

The next variety as regards both quality and commercial value is the Steelhead. (*Salmo gairdneri.*) These are in the river the whole year, but are not in prime condition during the spring months of April and May. They vary in size all the way from four to twenty pounds; and when in good condition the flesh is quite red and very hard and firm. The latter quality renders it an excellent fish for shipping long distances fresh, either with or without ice. A great many of these are used in our home markets during the winter months when other fish are scarce; and in the summer, large quantities are shipped to the interior, where they bring a good price.

The next to make their appearance are the Silversides. (*Oncorhynchus kisutch.*) They come about the middle of September and continue until about the fifteenth of November. They are a very good fish if taken before they have been too long in fresh water. They weigh from seven to ten pounds each, the flesh being a pinkish color. They are used mostly in our home markets, some being shipped away. These are the distinct varieties of salmon found in the Columbia River; and as may be seen from the above, there is not a month in the year in which a good edible salmon may not be taken from its waters.

The other kinds of fish that inhabit the Columbia River are sturgeon, which are to be had the whole year, and of much better quality than those of the Great Lakes or the rivers emptying into the Atlantic Ocean. These are caught in great numbers by trawls similar to those used in catching codfish. The fishermen get from one to two cents per pound live weight, and at these prices make fair wages during the fall and winter months. Smelt are taken in large quantities from the middle of January to the first of March, being so plenty at times that they can be taken in any quantity desired by means of a common dip-net. Shad are becoming quite plentiful here; they are an off-

shoot from the fry planted by the United States Fish Commission some years ago in the Sacramento River. They attain a larger size here than in the Eastern rivers, being frequently caught weighing eight pounds each. They are far superior to those found on the Atlantic Coast, and are destined to become an important article of commerce as well as cheap food for the people of this State. Carp and bullheads, a species of catfish, are found in abundance in the Willamette River, and are becoming a daily article of cheap food; being of a voracious nature, they are easily caught by hook and line, furnishing the boys, and sometimes men, an endless amount of sport as well as a good, wholesome article of food.

The readers of this article must not get the idea that the Columbia is the only river in Oregon that has a supply of salmon and other food fish. South of the Columbia we have the following streams: Nehalem, Tillamook Bay, with several tributaries, Nestucca Bay, Salmon River, Siletz, Yaquina, Alsea, Siuslaw, Umpqua, Coos Bay, Coquille, Rogue River, and Chetco. All rivers south of the Columbia are short, small streams, in which are found only what are termed fall salmon, or the varieties known as Silversides and Steelheads, with the exception of the Umpqua and Rogue Rivers, in which are found a run of spring salmon the quality of which is nearly equal to the Chinook of the Columbia River. The spring salmon being found in these two streams and in none of the others, is accounted for by the fact that these streams have their source in the Cascade Mountains, and are fed with snow water; while the others take their rise only in the Coast Range of mountains.

The value of the salmon fishing industry of the State of Oregon for the past twelve years has averaged $3,000,000 annually, or a total of $36,000,000. With proper care under the present laws of the State, and with sufficient money for the erection and maintenance of hatcheries for the artificial propagation of salmon, there is no reason why there should be a falling off in the industry for years to come; and there is every chance in favor of its increasing.

For the disciples of Sir Izaak Walton, there is not another State in the Union where they can enjoy themselves as in Oregon. The unnumbered mountain streams it contains are well supplied with trout of all sizes, and at nearly every cast of the fly one of these speckled beauties may be landed.

The fisheries of Oregon are not only valuable to those engaged therein, but are of great value to the residents of the whole State by furnishing profitable employment to a large number of working men, and also by producing a vast amount of cheap and nutritious food for its inhabitants.

MANUFACTURING.

"The two essential elements of profitable manufacturing—the cheapness and abundance of raw material and fuel—exist in Oregon to a marked degree. Another of equal if not greater importance also exists; that is, an abundant water power, of which no other State in the American Union is better supplied. The falls of the Willamette at Oregon City could supply sufficient power for the entire industry of a community with a larger population than that of the whole State at present, it being equal to over a million-horse power,

and capable of great extension with but little expense. The entire volume of the river here falls over a ledge of rocks forty feet high, and the surroundings are peculiarly suited to its utilization. The water power of Salem ranks next to that of Oregon City, it being obtained by means of a canal leading the waters of the Santiam River into the bed of another small stream, and thence to Salem. It is estimated that the power thus provided is equal to that of Lowell, Massachusetts. There is also considerable power at Albany, Harrisburg, and Eugene. At Springfield, three miles above Eugene, great power is furnished by the middle fork of the Willamette. The other two forks of the Willamette also afford vast power. The Tualitan River supplies great power, and the Yamhill, La Creole, Luckiamute, Mary's River, and Long Tom also afford considerable water power. The water power on the upper Columbia is very important, and at the Cascades, sixty miles from Portland, the river has a fall of forty feet, from which power could be supplied to mills for miles on each side of the river. A number of tributaries of the Columbia, such as Sandy, Hood, and Des Chutes Rivers, and Mill Creek, furnish power. In Southern and Southeastern Oregon power is obtained at Ashland and on Link River, which connects the Upper Klamath with Lower Klamath Lakes. The power on the latter is supposed to equal that of Oregon City. At several points in Oregon some of the smaller streams have falls of from 100 to 500 feet, which could easily be utilized. In fact, there is hardly a corner of the State in which the cheapest of all powers does not exist in almost unlimited amounts. The climate permits of all kinds of labor, indoor and outdoor, at all times of the year. There is iron, wood, and coal in abundance, and all the other materials are found, while the superficial conditions are favorable.

Next to the lumbering industry, probably the most important is the manufacture of woolen goods, which has attained a high degree of perfection. The most important woolen mills are located at Salem, Oregon City, Albany and Brownsville. A woolen mill at Dallas, Polk county, is now nearly completed. The cassimeres, flannels, and blankets manufactured in these establishments are of a superior quality, and find ready market both at home and abroad. There are numerous first-class flouring mills in the State worked mainly by water power. Ship building has been followed for some time with success at different points on the Oregon coast, and a number of fine vessels built there are now afloat. Not far from the iron mines near Oswego, described in the chapter on mines and mining, a furnace and a foundry on a large scale have been in operation for years. The pig iron turned out by the furnace is of superior quality, and is sold in the home market, as well as in San Francisco, where it is deemed equal to Scotch iron. A paper mill near Oregon City produces thousands of pounds of straw and other paper daily. Wood pulp is manufactured at Oregon City. For a full description of such manufacture see the article on Clackamas County. There are a number of factories where wooden ware is produced. A linseed oil mill is in operation at Salem, and flax mills are operated at Salem and Albany. Hemlock and oak bark are obtained in vast quantities, hence a number of tanneries are in operation. Several establishments are in operation for the manufacture of agricultural implements, and there is at least one well-equipped carriage factory. Furniture of

all sorts is manufactured from native woods. Although these manufacturing industries are scattered all over the State, Portland, being the general center of trade and transportation, and the chief seat of population, is the manufacturing center of the State, and already the bulk of the manufacturing is here."

TRANSPORTATION.

Oregon is fortunately situated with reference to transportation facilities. In the matter of railway communication, there are now in operation roads as follows: The Southern Pacific operates a road from Portland to the Southern Oregon boundary, three hundred and fifty-eight miles, through the Willamette Valley and the southern part of the State. A branch line of the same company, on the west side of the Willamette River, from Portland to Corvallis, ninety-seven miles; and on the east side east of the main line from Woodburn to Springfield, in Lane County, one hundred miles along the eastern side of the Willamette Valley, and through a rich country. This company also has a branch from Albany, in Linn County, to Lebanon, in the same county, thirteen miles, which gives an outlet to a rich and productive section. The Oregon Pacific, from Albany west to Yaquina Bay, eighty-three miles (connecting with a line of steamers running to San Francisco, California,); and east to the foot of the Cascade Mountains, forty miles. The Narrow-Gauge, from Portland to Airlie, on the west side of the Willamette Valley, and near the foot of the Coast Range, seventy-nine miles, through a beautiful and prolific section. The Northern Pacific has about forty miles of road in Oregon, running north to Goble, opposite Kalama in Washington, where the cars are transported across the Columbia River and proceed to Tacoma and Seattle, and thence east to St. Paul. The Union Pacific has lines from Portland east through the best part of Eastern Oregon to Huntington, four hundred and four miles, and thence east to Omaha. It also has branch lines to Heppner, in Morrow County, forty miles from Willows, on the main line; another branch from Umatilla Junction to Walla Walla, across the northern boundary of the State; another from La Grande to Elgin, in Union County, twenty-one miles; another branch from Pendleton to Spokane, across the northern boundary of the State. Thus it will be seen there are three different companies operating through lines from Portland, Oregon, to different points in the East, while at the same time the principal portions of the State are crossed by railroads.

The Willamette River is at present navigable at all seasons of the year to Harrisburg, 120 miles from its junction with the Columbia, and a small outlay on the part of Congress would make this river navigable to Eugene, Lane County, 138 miles from the Columbia, the entire year, unless it may be for a few weeks during the driest season. The Columbia River is navigable along the entire northern boundary of the State, with this exception, that at two points, the Cascades and The Dalles, there are material obstructions. These can easily be removed, and Congress has already made appropriations for locks at the Cascades, which are now in course of construction. At the dalles at Celilo it is proposed to build a boat railway. Congress is now considering the matter, and an appropriation will doubtless be made at this session (1892) for

that purpose. The State of Oregon has built a portage railway at the Cascades, pending the completion of the locks, over which much freight is shipped from Wasco and adjoining counties to Portland by steamboats now plying on the Columbia and Willamette. Snake River, which penetrates the northeastern part of Oregon, is now navigable in places, and it will not require a very large outlay to make it fit for steamers of fair draught for long distances inland.

The Columbia River affords one of the best harbors in the world; and that the channels of the Columbia and of the Willamette Rivers are ample is proved by the fact that the Baltimore and Charleston, two large war-ships of the American Navy, ascended these rivers to Portland, 120 miles, and are now (May 30, 1892,) lying at anchor in the Willamette River in the heart of the city. Along the coast south of the Columbia River are Tillamook Bay, Nestucca River, Yaquina Bay, Alsea River, Siuslaw, Umpqua River, Coos Bay, Coquille River, and Rogue River, each of which will admit coasting vessels of light draught, while some of them, especially Coos Bay and Yaquina, will admit ocean vessels of good size. Most of the streams above mentioned are navigable from ten to fifty miles inland, thus furnishing a means of water transportation with the outside world. An examination of these natural waterways will demonstrate one fact beyond question, and that is, the people of Oregon will always be furnished with competing lines of transportation, thus securing to themselves reasonable rates for fares and freights.

EDUCATIONAL.

PUBLIC SCHOOLS.—ANALYSIS OF THE OREGON SYSTEM.

By E. B. McELROY, STATE SUP'T PUBLIC INSTRUCTION.

I.—OUTLINE.

A.—Territorial Divisions, consisting of—

1. State.
2. County.
3. Cities and towns.
4. School districts.

B.—Officers.

1. State Board of Education—Governor, Secretary of State, and State Superintendent of Public Instruction.
2. State Superintendent of Public Instruction.
3. County Superintendents.
4. City Superintendents.
5. County Board of Examiners.
6. Directors and clerks of city and town districts.
7. Directors and clerks of school districts in general.

C.—Institutions in General.

1. Graded schools in cities and towns.
2. Normal training schools.

3. Ungraded district schools.
4. City institutes for teachers under supervision of city superintendents.
5. County and local institutes for teachers under supervision of county superintendents.

D.—Higher and Special Institutions of Learning.

1. State University at Eugene.
2. State Agricultural College at Corvallis.
3. State Normal Schools at Ashland, Drain, Monmouth, and Weston.
4. School for the Blind at Salem.
5. School for the Deaf and Dumb at Salem.
6. Orphans' Home at Salem.
7. Orphans' Home at Portland.

II.—OUTLINE.

A.—State Divisions.

1. Establishes schools.
2. Provides for a uniform system of public instruction, text-books, taxes, etc., etc.
3. Provides for State Board of Education.
4. Elects State Superintendent of Public Instruction.
5. Establishes benevolent and special schools.
6. Provides for the management of school funds.
7. Establishes universities, colleges, and professional schools.

B.—County Divisions.

1. Elects a County Superintendent.
2. Secures uniformity in text-books and other features of school work under the general laws of the State.

C.—City Divisions.—Cities of 10,000 *Inhabitants.*

1. Have local and general control of schools.
2. Employ city superintendents, teachers, janitors, etc., and fix their compensation.
3. Prescribe course of study.
4. Make rules and regulations for government of districts.
5. Lease and build schoolhouses, buy and lease lands, furnish apparatus, furniture, levy taxes, make annual printed report, fix rates of tuition, etc., for school purposes.

D.—School District Divisions.

1. Districts are formed in the villages, towns, and country for the purpose of extending, localizing, and permanently establishing educational facilities.
2. School districts are public corporations.
3. Schools districts are organized under the provisions of the general statute.

III.—OUTLINE.

A.—State Board of Education—Powers, etc.

1. Members hold office by virtue of elective official position.
2. Hold semi-annual meetings at the State Capitol on the first Monday in January and July.
3. Sit as a Board of Examination at their semi-annual meetings.
4. May establish a State Board of Examination.
5. Have power to grant State certificates and diplomas.
6. Prescribe rules and regulations for the general government of public schools.
7. Have power to make decisions on appeals and other powers of general and special supervision.
8. Serve for a period of four years.

B.—State Superintendent of Public Instruction.

1. Serves for a period of four years.
2. Is elected by the people.
3. Has general supervision of public schools.
4. Makes biennial reports to the Legislative Assembly.
5. Is secretary of the State Board of Education.
6. Is authorized to hold meetings of County Superintendents.
7. Annotates and compiles all school laws ordered published.
8. Issues letters and circulars of information, explanation, and construction to county and district school officers.
9. Holds biennial institutes for teachers in each judicial district.
10. Attends county institutes when practicable.
11. Holds a State Teacher's Association annually.
12. Makes decisions on appeal from school officers, etc.
13. Prepares uniform series of blanks, registers, forms, rules and regulations for use of public school officers and teachers.
14. Visits educational institutions of the State, and secures statistics of same when possible.
15. Issues quarterly uniform series of questions to the several County Superintendents for examination of teachers.
16. Visits, as far as practicable, every county in the State annually in the interests of education.

C.—County Divisions.—County Boards of Examiners.

1. Is composed of the County Superintendent and two competent persons.
2. They hold public examinations quarterly, and issue three grades of county certificates,—first, second, and third,—that continue in force two years, one year, and six months, respectively.
3. They may sit as a board of appeals, and may consider all questions that will advance the best interests of the county public schools.

D.—County Superintendent.

1. Serves two years.
2. Is elected by the people.

3. Establishes school districts.
4. Makes apportionment of school funds.
5. Makes an annual financial report to county court.
6. Makes an annual report to Superintendent of Public Instruction.
7. Examines teachers and issues certificates.
8. May revoke certificates obtained by fraud, etc.
9. Is chairman of board of county examiners.
10. Holds an annual institute for the teachers under his supervision.
11. Visits schools annually.
12. Holds local institutes.
13. Hears, examines, and decides appeals from district officers, teachers, and others.
14. Receives reports from district officers and teachers.
15. May arrange a course of study for county schools.
16. Has an advisory power in the location of schoolhouses, selection of teachers, etc.
17. Is *ex officio* chairman of board of arbitrators for division of school property.

E.—District Directors.

1. There are three for each district.
2. They are elected by the legal voters in the district, and serve for three years.
3. They employ teachers and assist them in the government of the school.
4. They audit all claims against the district, and draw all orders.
5. They locate, establish, and provide schools.
6. They may levy taxes for buildings, furniture, school sites, apparatus, etc
7. Examine and correct assessment rolls.
8. They may levy rate bills under conditions.
9. They have entire control of the district schools within certain limits.
10. They must enter into a written contract in employing teachers.
11. They have power to locate schoolhouses.
12. They must prosecute any person for wilfully injuring school property.
13. They issue calls for regular and special meetings.
14. They can dismiss teachers only for good cause shown, and the teacher may take an appeal.
15. Two directors constitute a quorum.

F.—District Clerks.

1. There is one for each district.
2. They are elected by the people, and serve one year.
3. They must give bonds.
4. The clerk is custodian of all school funds.
5. The clerk is *ex officio* treasurer and pays all warrants.
6. They make out assessment rolls, and collect taxes.
7. They make an annual census of the district.
8. They must keep correct accounts of all meetings and other business.
9. They must make annual reports to the county superintendent.
10. They receive, examine, approve, and file teachers' reports.

STATISTICAL SUMMARIES FOR THE YEARS 1890-91.

1.	Whole number of organized districts in the State for the year 1890	1,693
	Whole number of organized districts in the State for the year 1891	1,747
	Increase	54
2.	Number of districts reporting during 1890	1,662
	Number of districts reporting during 1891	1,724
	Increase	62
3.	Whole number of persons reported between 4 and 20 years, 1890	99,543
	Whole number of persons reported between 4 and 20 years, 1891	106,172
	Increase	6,629
4.	Number of pupils enrolled, 1890	63,254
	Number of pupils enrolled, 1891	72,322
	Increase	9,068
5.	Daily average attendance, 1890	43,018
	Daily average attendance, 1891	45,401
	Increase	2,383
6.	Number of teachers employed in public schools during 1890	2,566
	Number of teachers employed in public schools during 1891	2,641
	Increase	75
7.	Average number days' school per district, 1890	118.20
	Average number days' school per district, 1891	141.20
	Increase	23.00
8.	Number of schoolhouses, 1890	1,499
	Number of schoolhouses, 1891	1,613
	Increase	114
9.	Total value of school property, 1890	$1,769,150 41
	Total value of school property, 1891	1,906,431 90
	Increase	$ 137,281 49
10.	Average salary paid male teachers per month, 1890	$ 46 43
	Average salary paid male teachers per month, 1891	50 76
	Increase	$ 4 33
11.	Average salary paid female teachers per month, 1890	$ 38 46
	Average salary paid female teachers per month, 1891	42 43
	Increase	$ 3 97
12.	Number of months private schools taught, 1890	405
	Number of months private schools taught, 1891	413
	Increase	

13.	Number of private schools taught, 1890	125
	Number of private schools taught, 1891	131
	Increase	6
14.	Value of schoolhouses and school sites, 1890	$1,599,920 13
	Value of schoolhouses and school sites, 1891	1,906,431 90
	Increase	$ 306,511 77
15.	Value of school furniture, 1890	$ 132,433 36
	Value of school furniture, 1891	160,012 39
	Increase	$ 27,579 03
16.	Value of school apparatus, 1890	$ 36,796 92
	Value of school apparatus, 1891	58,357 76
	Increase	$ 21,560 84
17.	Number of male teachers employed, 1890	1,111
	Number of male teachers employed, 1891	1,059
	Decrease	52
18.	Number of female teachers employed, 1890	1,455
	Number of female teachers employed, 1891	1,582
	Increase	127
19.	Number of applicants for teacher's certificates, 1890	1,609
	Number of applicants for teacher's certificates, 1891	1,574
	Decrease	35
20.	Number of teachers employed holding first-grade certificates, 1890	727
	Number of teachers employed holding first-grade certificates, 1891	1,035
	Increase	308
21.	Number of teachers employed holding second-grade certificates, 1890	747
	Number of teachers employed holding second-grade certificates, 1891	784
	Increase	37
22.	Number of male pupils enrolled in private schools, 1890	2,356
	Number of male pupils enrolled in private schools, 1891	3,158
	Increase	802
23.	Number of female pupils enrolled in private schools, 1890	2,706
	Number of female pupils enrolled in private schools, 1891	3,285
	Increase	579
24.	Number of teachers employed in private schools, 1890	262
	Number of teachers employed in private schools, 1891	296
	Increase	34

COMPARATIVE STATISTICS.

Showing the Educational Progress of the State from 1873 to 1890, since the Organization of the Department.

	1873.	1874	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Number of districts	642	680	755	795	750	901	978	1,007	1,037
Average number days school per year	90	90	82	98	86	93	88	90	86
Average salary of male teachers per month	$ 47 54	$ 45 92	$ 45 68	$ 49 20	$ 47 24	$ 45 25	$ 43 90	$ 44 19	$ 42 26
Average salary of female teachers per month	43 70	34 46	33 64	34 73	34 87	31 30	33 80	33 38	31 72
Whole amount paid teachers per annum	154,944 00	157,103 00	113,962 00	181,902 00	182,714 00	194,571 00	205,523 00	210,429 00	231,818 00
Amount received from district tax	71,152 00	47,213 00	92,035 00	57,852 00	51,009 00	73,456 00	84,189 00	79,562 00	91,568 00
Amount received from county tax	80,138 00	87,573 00	117,182 00	122,189 00	118,053 00	125,704 00	119,728 00	133,477 00	146,806 00
Amount received from state funds	32,420 00	31,589 00	33,367 00	31,226 00	38,551 00	33,237 00	48,117 00	36,910 00	48,346 00
Total amount school funds	184,010 00	201,760 00	258,871 00	269,822 00	235,337 00	258,785 00	351,673 00	339,080 00	358,018 00
Total value of school property	322,440 00	332,764 00	301,737 00	442,540 00	395,563 00	483,058 00	520,963 00	567,863 00	657,468 00

COMPARATIVE STATISTICS.—Concluded.

	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Number of districts	1,093	1,131	1,206	1,336	1,371	1,491	1,518	1,600	1,693
Average number days school per year	90	86	90	95	101.5	99.2	101.8	103.88	118.20
Av. salary male teachers per month	$ 43 95	$ 45 15	$ 46 75	$ 48 22	$ 46 20	$ 45 78	$ 46 20	$ 46 31	$ 46 43
Av. salary female teachers per month	31 63	33 47	31 45	36 96	34 65	34 70	36 97	36 75	38 46
Whole am't paid teachers per annum	249,378 00	259,370 82	286,959 55	342,186 37	375,158 49	413,515 36	424,936 50	506,594 90	563,593 54
Amount received from district tax	102,810 00	135,356 20	151,067 16	141,124 38	131,580 08	165,446 65	179,785 22	172,639 98	229,471 71
Amount received from county tax	141,980 00	177,181 47	195,397 90	260,141 81	260,261 54	286,377 33	322,243 52	416,911 50	411,765 03
Amount received from state fund	59,662 00	50,981 74	53,370 96	77,938 48	75,565 11	85,625 20	93,448 86	115,364 48	151,187 12
Total amount of school funds	385,218 00	538,798 51	501,599 95	578,340 96	901,272 26	669,935 34	801,638 95	916,407 39	1,062,890 18
Total value of school property	684,297 00	823,409 82	1,454,506 49	1,160,433 14	1,239,998 00	1,271,818 06	1,295,217 55	1,533,103 73	1,769,150 41

LIST OF COLLEGES, ACADEMIES, ETC., IN OREGON.

NOTE.—The list given below presents the names and location of all the chartered institutions of learning in this State, including the universities, colleges, seminaries, academies, and private schools.

Name.	*Town.*	*County.*
Academy of the Sacred Heart	Salem	Marion.
Academy of the Holy Names	East Portland	Multnomah.
Albany Collegiate Institute	Albany	Linn.
Baker City Normal and Business College	Baker City	Baker.
Ascension Seminary	Cove	Union.
Bethel Academy	Bethel	Polk.
Bishop Scott Grammar School	Portland	Multnomah.
Columbia Business College	Portland	Multnomah.
Drain Academy	Drain	Douglas.
Pacific College	Newberg	Yamhill.
Grace Church Parish School	Astoria	Clatsop.
Holmes Business College	Portland	Multnomah.
Independent German School	Portland	Multnomah.
Jefferson Institute	Jefferson	Marion.
La Creole Academy	Dallas	Polk.
Leighton Academy	Cove	Union.
Linnean Academy	Harrisburg	Linn.
McMinnville College	McMinnville	Yamhill.
Mt. Angel College	Mt Angel	Marion.
Mt. Angel Academy	Mt. Angel	Marion.
Notre Dame Academy	Baker City	Baker.
Philomath College	Philomath	Benton.
Portland University	Portland	Multnomah.
Portland Business College	Portland	Multnomah.
Santiam Academy	Lebanon	Linn.
St. Michael's College	Portland	Multnomah.
St. Mary's Academy	Portland	Multnomah.
Sacred Heart School	Portland	Multnomah.
St. Joseph's School	Portland	Multnomah.
St. Mary's Academy	The Dalles	Wasco.
St. Mary's Academy	Jacksonville	Jackson.
St. Paul's Academy	St. Paul	Marion.
St. John's Academy	Oregon City	Clackamas.
St. Joseph's Academy	Pendleton	Umatilla.
State Agricultural College	Corvallis	Benton.
State University	Eugene City	Lane.
State Normal School	Monmouth	Polk.
State Normal School	Ashland	Jackson.
State Normal School	Drain	Douglas.
State Normal School	Weston	Umatilla.
State Normal School	The Dalles	Wasco.
Umpqua Academy	Wilbur	Douglas.
Verboots School	Cornelius	Washington.
Willamette University	Salem	Marion.
Wasco Independent Academy	The Dalles	Wasco.

OREGON FRUITS—WILD AND CULTIVATED.

By J. R. CARDWELL, PRESIDENT STATE HORTICULTURAL SOCIETY.

Inspiration and tradition tell us that man was created a horticulturist; and that in his best estate he was surrounded by the choicest fruits and flowers of nature, and that now, in his better self and ideal of life, he returns to the ancient shrine and in poetic imagery dwells in the Elysian fields of Pomona; prophetic of something higher and better attainable in the future.

Fruit culture is the most fascinating, ennobling, as well as the most profitable branch of horticulture, and the advance in the fruit product is evidence

of the culture and civilization of a people. It is hard to overestimate the beneficial influence on health, morals and manners of a generous fruit supply. The ornamental grounds and orchards of the homestead do much in childhood to strengthen that love of home and pride of family which is the foundation of all patriotism. The cherished memories of home thus enriched, are, in after life, the strongest bond of family to bring back the absent and wandering to the roof tree; and the erring one is not wholly lost so long as these sacred memories of home and childhood sometimes come to swell the heart and dim the eye with the tear of repentance and contrition.

The fruit industry as a business in its variety, extent and commercial importance, as we find it to-day, is of recent origin and within the memory of the present generation, a worthy tribute to the brain and muscle of men of our time. National and international communication by water, land and telegraph, railroads, cheap freight rates, rapid transit in fruit and refrigerator cars, created the supply; inversely, the supply increased the demand: an inexorable law of trade. The future commercial possibilities of the fruit trade are full of promise, and in the light of the increase of the last few years, justify the most sanguine speculations. Shipping green fruit, canning and evaporating, are discoveries of to-day, and yet in their infancy These processes will be improved upon, extended and cheapened, and other improved methods of packing, preserving and transporting will be discovered, as popular taste is cultivated. The new glazed fruit industry is capable of indefinite extension; fruit as a confection to eat out of hand is a new and growing industry The manufacture of fruit butters, marmalades, jams, and jellies, not to speak of fruit cider, vinegars, brandies, wines, and spirits, are undeveloped business schemes of great promise. Brain and muscle are at work in these lines and will succeed.

A distinguished and successful fruit grower of California was requested to furnish a paper on "The Fruit Industry" for publication in the transactions of the California Agricultural Society. The response — brief, comprehensive, in the following well-chosen words — applies so well to Oregon that I am inclined to quote and close this paper: "There is still room in California [Oregon] for thousands of intelligent fruit growers, such as will plant the right thing in the right place, take proper care of the trees when growing, prune properly, when in bearing thin properly, pick at the right stage of ripeness and pack nicely in clean boxes, fight all damaging insects and fungi with the best implements and insecticides to be had, and otherwise use all the intelligence they have in their business. I believe eternal vigilance is the price of good fruit in this or any other country, and for that reason think there will always be a good price for good fruit. Concert of action and union of purpose among fruit growers is all that is necessary to make fruit shipping profitable and maintain it so."

Ten thousand square miles of the valleys and foot hills of Oregon are in every way adapted to the culture of all the fruits grown in this latitude, of the finest quality and in the greatest luxuriance. Before the advent of the white man and cultivated fruits, this country had demonstrated its capacity to produe the wild fruits abundantly, of fine flavor and excellence. The Indians, trappers, and pioneers valued these highly and made good use of them. As they were in some sense evidence of a soil and climate adaptation, and pro-

phetic of the great fruit industry now growing up among us, it is not out of place to briefly make some record of them; and this seems the more important in view of the fact that the Pomological Division of the Interior has taken up the subject and is making collections and urging the improvement of indigenous fruits by selection, hybridizing and cultivation, and that some of our best fruits have been thus produced.

The Oregon Crab Apple (*Pyrus rivularis*) is found on cold, marshy ground, bordering ponds, mountain springs and streams, and when favorably situated is a good sized tree and attains a diameter of one foot, and an altitude of twenty feet. Its rich green, spreading top, in the season bears heavily a small, oval, golden-colored apple, which, when ripe, is eaten by the Indians, and was used in early times by the white settlers for making preserves, jelly, and vinegar. This species has been hybridized, and improved by some of our nurserymen, and no doubt will be further improved, which may lead to a valuable variety in the future.

The Oregon Wild Plum, (*Pyrus subscordata*,) of which there are two or three varieties, was much valued in early times for its fruit to eat green, for preserves and jam This plum for quality is about the same as the native red plum of the middle West, and has been improved by selection and cultivation; was used formerly by nurserymen for stock on which to graft the plum and prune. The tree grows to a height of ten or fifteen feet. Another variety produces a round fruit nearly an inch in diameter; another an oblong, resembling in shape, color and quality the Damson, and by those who use them, preferred to that variety. Of these something may be expected from hybridizing and cultivation.

We have two or more species of Wild Cherries—one, *Cerasus demissa*, a shrub or small tree bearing a purplish black fruit, very much resembling the choke cherry, though of much better quality and edible; is used to some extent for marmalade; its roots have been used as stock to work improved varieties upon. The other, *Cerasus emarginati*, sometimes attains to the dignity of a tree one foot in diameter and thirty to forty feet high, and bears a roundish black cherry about one-third of an inch in diameter, bitter and astringent.

The Oregon Elder (*Sambucus glauca*) is a character tree of unsurpassed elegance and rare beauty on the lawn or in the forest; is of vigorous growth, attaining two feet in diameter and thirty feet in height, with a beautifully cut leaf of rich bluish green, decked with showy sprays of creamy white flowers six to ten inches across, and in the fall of the year gorgeously arrayed and heavily laden with purple berries, interspersed with green fruit and blossoms, which continue to bud and bloom from June to September, giving a succession of flowers, green fruit and ripe purple berries the entire season. The berry has a pleasant, sub-acid taste, and with a little sugar is palatable in pies, stewed, or in preserves, and properly prepared makes an excellent wine, for which it is now often used. Another variety of smaller growth (*Sambucus pubescens*) has a red berry, also edible. This variety is not so widely distributed, and is only found along the coast and up the streams inland.

The Grape (*Vitis Californica*) is found in the southern part of the State, and has been much used in other countries as a phyloxera resistent stock, on

which to work European varieties. This fruit is something like the fox grape of the East, and has been some improved by selection and cultivation, and will doubtless be of value in the future.

Oregon is a land rich in native berries, which were held in great esteem by the Indians and early settlers, some of which are really fine and yet much sought after and utilized, and form a considerable commerce in our towns and cities.

The Wild Blackberry (*Rubes ursinis*) is very abundant every where, and takes possession of neglected fields, fence rows and burned districts. The fruit is of good size, oblong, very sweet and juicy, and believed by the children and good housewife to be for all purposes much superior to the cultivated varieties. Tons of this fruit are gathered and sold to families, and if there were more pickers a large commerce could be made with the canneries. The Aughinbaugh is a sport from this species.

Of Raspberries, we have four varieties—the Salmon berry (*Rubus nutkanis*), a large, yellowish red fruit, with a white bloom, juicy, sweet, highly flavored, very palatable; a red berry (*Rubus incodermis*), highly aromatic, soft, sweet and very good; a Black Cap (*Rubus pendens*), not unlike Gregg's Black Cap, and with us, under cultivation, fully its equal. This berry is widely distributed and abundant. A Black Raspberry (*Rubus spectabilis*), being rather hard and dry to rank first-class, yet with a peculiar flavor; very palatable to some tastes.

The Wild Strawberry (*Fragrara Chilensis*) is widespread, abundant, and very prolific, so that in some regions it is said hogs fatten on them. The berry is not large, but improves under cultivation, and by some is classed superior in flavor to the cultivated kinds. Several fine varieties have been produced by cross fertilization with this, among which are the Tryomph Legand, True Chili, and several other varieties.

We have several Wild Currants, one a beautiful shrub, and sought in the Eastern States and Europe as an ornamental lawn plant, and valued for its elegant foliage, and early and profuse bloom of pink and scarlet flowers; berry not edible. The Yellow Currant (*Ribus aurum*) responds well to cultivation, and in the wild state is of good size and edible.

Of Gooseberries, two or three kinds are common. *Ribes Menziesi* is a large hairy berry, edible, but rather insipid, and is not much used. Two others are red and brown when ripe, a fourth of an inch in diameter, sweetish tart; good for culinary purposes; do not know of their cultivation.

Four or more Cranberries are found in the State. *Viccinium Parvifolium* is a pale red berry, small, dry, with a very slight cranberry taste, and not used. *Viccinium Ovalifolium*, high bush Cranberry, is a large blue berry, good, and in some localities where fruit is scare, very useful; much sought by the Indians. *V. Microphyllum* is a red, high bush Cranberry, smaller, juicy and palatable; only found high up in the mountains. Another is found in the Cascade and Coast Ranges as an evergreen bush, and bears a dark, purple berry; edible. Local botanists speak of other varieties.

The Barberry (*Berberis Aquefolium*), Oregon Grape, so called, is a superb and elegant ornamental evergreen shurb, in leaf somewhat resembling the

English holly; in the wild state growing two or three feet high; under cultivation making a showy lawn plant, six to eight feet, with finely cut, polished leaves and symmetrical head; early in spring bearing a profusion of showy, yellow flowers, followed in their season by clusters of dark purplish black berries, the size of wild cherries; altogether a thing of beauty rarely equaled; fruit acid and make a fine beverage, and good pies or preserves. There are others of the Barberry family.

The Salal (*Gultheria Myrsinites*) is scattered through the dense fir forests of the State; is another beautiful, small shrub, evergreen, bearing an acid, edible berry, size and color of the Oregon grape; much sought by the Indians, and in early days made an excellent wine for the resident Hudson Bay Company employés. The Salal is probably a variety of wintergreen, and seems to thrive best in the deep shade of the forests; has not been cultivated.

The Service Berry, or June Berry, a small tree six to twelve feet high, we expect to make a good record for in the future. This has been cultivated in other parts of the world and much improved. The Service Berry in the Willamette Valley grows in all soils, and at altitudes as high as the snow line, bearing a sweetish, pleasant-tasting berry about the size of our largest wild cherry; as yet has not been cultivated with us or much utilized.

A Black Haw (*Crataegus Douglassi*), not unlike the Black Haw of the middle West, is sparsely found in some localities.

Our one Filbert, Hazel Nut (*Corylus Rostrata*), is of the same species as the imported nuts in our market, and closely approximating in size, flavor and quality, and grows everywhere in our valleys, sometimes to a tree ten inches in diameter and from eight to fifteen feet high. No effort is recorded of any attempt to cutivate or improve it.

A kind of Chinquapin Chestnut (*Castonopsis Charysophylia*), is a symmetrical growing tree, fifty to one hundred feet high, bearing abundantly a small hardshell chestnut, sweet and edible.

It is not too much to say that all the valleys and foot hills of Oregon are fruit lands, and abound in choice spots for the different fruits cultivated in our climate; or more properly speaking, climates. The Coast and Cascade Mountain Ranges divide Oregon into three distinct, well defined climatic regions, which may be further divided into coast and inland, influenced and modified by the altitude of the country and the Japan equatorial ocean current, carrying a warm moisture-laden air, which gives the whole State a mild and equable climate not found elsewhere in this latitude. Southern Oregon, with sunshine, mild and open winters, seasonable showers, and annual rainfall of twenty-five to thirty inches, with warm summers fanned by gentle sea breezes, mean summer and mean winter temperature varying only 11.4 degrees, a productive soil, is altogether a country desirable to live in. Briefly epitomized, Southern Oregon is a great fruit country, now filling up with a prosperous fruit-growing population. Its extensive fruit lands are being largely set to orchards and vineyards, and are soon destined to yield of the finest fruits the sun ever shone upon an hundredfold, and become a source of wealth to its people and the State at large.

In Western Oregon cooler summers and much more rainfall; winters mild, with temperature rarely down to zero; annual rainfall, 55.4; mean winter temperature, 40; mean summer temperature, 64; rains generally warm and without wind; no devastating storms have ever occurred; summers too cool for corn or melons, with daily sea breeze and cool nights; seasonable showers and ample moisture during the growing season; no strong winds.

The Willamette Valley, the first settled and the center of the wealth and population of the State, is thirty to forty miles wide and one hundred and twenty miles long, and with the foot hills, estimated to contain eight thousand square miles of tillable lands. There is evidence that this for a long time was an arm of the Pacific Ocean; a great inland sound, which has deposited off shore old forests, gravel, sand and silt, varying from a few hundred to thousands of feet deep. Mr. Ladd's well near Portland, nearly two thousand feet deep, showed all the way down strata of sand, gravel, decayed vegetation, soil, old forests, drift and marine deposits. Railroad cuts and wells show that this deposit, when brought to the surface from any depth, is rich in all the elements of vegetable growth. So it may be said that we have a deep, fertile soil. The general character of surface soil is a dark, slightly sandy loam, nearly black when wet, with a previous sub-soil of sandy clay. In small tracts in the foot hills are found red or light brown loams. The face of the country is gently rolling, or nearly level prairie, with the Willamette River running near the center, fringed with a dark fir forest, interspersed with the oak, maple, ash, alder, and other forest trees of Oregon Occasional clear, wooded streams put in from the mountains on either side, and intersect the valley to the river. The evergreen and picturesque foot hills in the distance, running back in waves to the ever-varying sky line of the darkly timbered mountains beyond, snow-capped Hood, in bold and rugged outline, reaching high above, altogether forming a landscape of surprising beauty and impressive grandeur seldom equaled. Along and among the foot hills are numerous little valleys and cosy, quiet home nooks, with here and there an oak opening, or clear running mountain stream, bordered with alder, ash, and cottonwood. These unoccupied hills and valleys are fruit lands, and offer a golden harvest to thrift and industry.

Eastern Oregon.—The saturated air of Western Oregon, having passed over the Coast and Cascade Mountains, and deposited its moisture and given up its heat in the heavy rainfall of Western Oregon, reaches the high plateaus of Eastern Oregon, making the colder and dryer climate of that region, light rainfall and cold winters, warm and dry summers, specially favorable to cereals, grapes, peaches and other of our fruits and vegetables. A prominent fruit-grower of Eastern Oregon makes the following estimate of the yield per acre in his locality on a seven-year-old orchard:

Apples	40,000 pounds
Peaches	30,000 "
Pears	40,000 "
Plums	50,000 "
Cherries	20,000 "

Grapes and berries to the acre:

Grapes	40,000 pounds
Blackberries	15,000 "
Raspberries	15,000 "
Gooseberries	5,000 "
Currants	10,000 "
Strawberries	6,500 "

Looking over the whole State, then, may we not summarize and add that among the varied resources of the great commonwealth of Oregon, potent in its capacity for contributing to the material development of the State to its proper position as one of the foremost States of the Union, it is not at all too much to say that fruit growing, if it is not destined to take the first rank, is certainly capable of being expanded into the equal of any. Neither Oregon's forests, its mines, its fisheries, its farms, dairies, cattle ranges, sheep walks, nor its manufactories will, in their future growth, be entitled to outrank its orchards if proper methods are adopted by the horticulturists of the State.

Here, under the peculiar climatic conditions by which we are surrounded, blessed as we are by fertile and responsive soil, is, as has been fully demonstrated, the natural habitat of the apple, the pear, the quince, the plum and the prune, in all its varieties. Here, in select localities, flourish the peach, the apricot and the almond. Here, under intelligently considered conditions, the grape, the fig, the pomegranate, the medlar pear, the Japanese persimmon grow to maturity, ripen and become useful and agreeable adjuncts of the farm and home. Melons and berries are at home here; and, in short, it may be said that, excepting the citrus and other semi-tropical fruits, Oregon offers to the fruit-grower an exceptionally attractive field for the exercise of all his faculties in this important and most attractive branch of the business of the tiller of the soil.

The early history of fruit-growing presents to the student at once a most romantic and a thoroughly practical and matter-of-fact series of interesting pictures. It is related of some of the earliest settlers in the Willamette Valley that nothing more thoroughly and painfully accentuated their isolated condition than the absence of fruit trees on their newly-made farms. Half the beauty and pleasure that brightens the life of youth and childhood, it is not too much to say, is found in the orchard of the old Homestead, the sight of the trees in bloom, the waiting and watching for the first ripe fruit, the in-gathering of the fruit in the fall, and the storing of it away in bin and cellar for use in the winter around the ingle-side.

Is it any wonder, then, that when some of the early settlers were called to Southern Oregon to aid their fellow-countrymen in repelling the attacks of Indians, and finding there wild plums and wild grapes, they brought with them on their return, roots of the former and cuttings of the latter, in the hope that these foundlings of the southern forest would take kindly to a more northern soil? In this act of transplanting was illustrated the world's hunger for the fruit of the vine and tree, so beautifully illustrated by Whittier in his poem commencing with these lines:

"The wild grape by the river side
And tasteless ground-nut trailing low,
The table of the woods supplied."

The old Puritans could not have been such terribly stern and uncompromising foes of the good things of life after all, since they knew enough to find gustatory delight in such fruits as kind mother nature provided for them in their exile.

So much so for the romantic side of the picture of Oregon's past in fruit growing.

Turning to the practical side of this subject, it seems fitting and proper that some record should be made of the unwritten pioneer history of this great benefaction fast fading from the memory of man. The intelligent foresight and patient labors of those who inaugurated this industry in the far-off wilds of Oregon, are worthy a place in the archives of the State, and should be kept green in the memory of those to come after us.

In the summer of 1847, Mr. Henderson Lewelling, of Iowa, brought across the plains several hundred yearling grafted trees—apple, pear, cherry, plum, prune, peach, grape and berries, a full assortment of all the fruit grown in the then far West. These were placed in soil in two large boxes, made to fit into a wagonbed, and carefully watered and tended on the long and hazardous six-months' journey with an ox team, thousands of miles to the banks of the Willamette, near the little townsite of Milwaukie, Clackamas County.

Here a little patch in the dense fir forest was cleared away with great labor and expense, and the first Oregon orchard was set that autumn with portent more significant for the luxury and civilization of this country than any laden ship that ever entered the mouth of the Columbia. A fellow traveler, William Meek, had brought a sack of apple seed, a partnership was formed, and the firm of Lewelling & Meek started the first nursery in 1848. Roots from seedling apples planted at Oregon City and on French Prairie, and sprouts from the wild cherry of the vicinity, and wild plum roots brought in from Rogue River Valley furnished the first stock. And it is related, that one root graft in the nursery the first year bore a big red apple, and so great was the fame of it, and such the curiosity of the people, that men, women, and children came from miles around to see it, and made a hard beaten track through the nursery to this joyous reminder of the old homestead so far away.

People in those days in this sparsely settled country knew what their neighbors were doing, and in the fall of 1848 and spring of 1849, they came hundreds of miles from all over the country for scions and young trees to set in the little door-yard or to start an orchard; so that the trees were soon distributed all over the settlements of the valley—yearlings selling at fifty cents to one dollar each.

The first considerable orchards were set on French Prairie, and in the Waldo Hills, and about Salem. Of Apples, the following varieties were common: Red Astrakan, Red June, Talman's Sweet, Summer Sweet, Gravenstein, White Winter Pearmain, Blue Pearmain, Genet, Gloria Mundi, Baldwin, Rambo, Winesap, Jennetting, Seek-no-further, Tulpahockin, American Pippin, Red Cheek Pippin, Rhode Island Greening, Virginia Greening, Little

Romanite, Spitzenburg, Swaar, Waxen, and a spurious Yellow Newton Pippin,—since called Green Newton Pippin,—a worthless variety which has since caused much trouble to nurserymen, orchardists, and fruit buyers, and brought by mistake for the genuine, and other varieties not now remembered.

Of Pears, the Fall Butter, Pound Pear, Winter Nellis, Seckle, Bartlett, and others.

Of Cherries, May Duke, Gov. Woods, Oxheart, Blackheart, Black Tartarian, Kentish, and others.

Peaches, the Crawford, Hale's Early, Indian Peach, Golden Cling, and seedlings.

Of Plums, the Gages, Jefferson, Washington, Columbia, Peach Plum, Reine Claude, and Coe's Late Red, were leading varieties.

Of Prunes, there was only one variety, our little German Prune, a native of the Rhine, sometimes called the Rhine Prune, and from which our Italian is a lineal descendant—a sport from its native country.

The Grapes were the Catawba and Isabella.

The climate was propitious, and the soil fertile, and there were no insect pests. Trees grew rapidly, and they were prolific of such fruit as had never been seen before.

About 1850, a Mr. Ladd started a nursery near Butteville, and in the same year Mr. George Settlemeir arrived by way of California with a good supply of fruit-tree seed, which he planted on Green Point, and afterward removed to his present home at Mt. Angel, where, as fast as his limited means would allow, a large stock of fruit and ornamental trees were accumulated, making in all, the largest variety in the Territory. Mr. Settlemeir wisely interested his large family of sons in the business by giving them little blocks of ground for side nurseries of their own. J. H. Settlemeir tells, with pride, how he started, at ten years of age, in three fence corners, and at thirteen had one thousand trees and sold one bill of sixty dollars. H. W. and J. H. Settlemeir still continue in the business.

Another nursery was started near Salem, and the pioneer fruit industry was fairly inaugurated. This year Mr. Lewelling went back East and selected from the extensive nurseries of Ellwanger and Barry, and A. J. Downing, a large variety of young trees and plants, which he brought back via the isthmus of Panama, carried across by Indians and mules. This time Mr. Lewelling, to correct his mistake in the Yellow Newton Pippin, had Mr. Downing personally point out the trees as they were dug. Strangely the same mistake occurred again, and again Lewelling brought out the Green Newton Pippin, and it was not for some years that the real Yellow Newton Pippin was introduced into Oregon. The first box of Apples placed upon the sidewalk in Portland by Mr. Lewelling was eagerly purchased by the admiring fruit-hungry crowd that gathered about at one dollar per apple, and returned the neat little profit of seventy-five dollars.

The home market now showed many of the above mentioned fruits, which were eagerly sought at fabulous prices. Apples brought as high as one dollar per pound by the box, and in Portland retailed at one dollar and fifty cents per pound readily, and all other fruits nearly as much.

Californians, fruit hungry, with plethoric purses, bid high for the surplus, and in 1853, a few boxes, securely bound with strap iron (as was the custom in those days to protect against fruit thieves), were shipped to San Francisco and sold for two dollars per pound.

In 1851 five hundred bushels of apples were shipped, and returned a net profit of from one dollar and fifty cents to two dollars per pound. In 1855 six thousand bushels were shipped, and returned twenty to thirty dollars per bushel. Young trees were now in full bearing, and the export of 1856 was twenty thousand boxes. This year one box of Esopus Spitzenberg paid the shipper a net profit of sixty dollars, and three boxes of Winesap were sold in Portland at one hundred and two dollars. From this time to 1869 the fall and winter shipments bi-monthly to San Francisco, per steamer, were from three thousand to six thousand boxes.

Our apples are large, of fine flavor, high color and good keeping qualities. Of pears, we grow all varieties so far as tested, equally well, high colored, of the largest size and unsurpassed quality. In cherries and prunes, for size and quality, we claim to beat the world's record. In peaches, grapes and small fruits, in favored localities, we will not take second place. Our fruits have attracted favorable attention wherever exhibited, and at two world's fairs—Philadelphia and New Orleans—against fifty States and Nations, with fifty thousand plates of fruit, Oregon received the premium for the best five plates of hill-grown apples; also for the best five plates of valley-grown apples, and the judges reported that we were entitled to the premium for the best sweepstake apple, but for the mistake of naming the plate Winesap instead of Roman Beauty, which it was. This mistake threw it out, and thus we lost the merited premium.

Our prunes, plums and cherries have never failed to take premiums wherever exhibited. Last season the State Board of Horticulture received at its office in Portland apples weighing from twenty-four ounces and upward — one apple, Gloria Mundi variety, weighing forty-four (44) ounces; cherries, the Royal Anns, measuring from three and a quarter to three and a half inches in circumference, and a seedling from J. H. Lambert, of Milwaukie, measuring from three and a half to three and three-quarters inches in circumference; peaches running from twelve to seventeen ounces, and of the best quality; prunes weighing four ounces,—dried product over an ounce,—and this is not uncommon. Boston, owing to the large residence of wealthy European families, is the best fancy prune market in this country, and pays more for prunes and other fancy dried fruits than any other city.

At the Chamber of Commerce in Boston this season, Mr. C. H. Ricker, residing near here, exhibited the Italian prune as grown and dried on his place. The fruit attracted great attention. The best experts were called, who know the prune as it is offered in the market of the world, and they pronounced this prune the equal if not superior to any they had seen. This sounds large, but is true, and will stand so in the markets of the world.

The Royal Ann Cherry (*Napoleon Bigarcau*), as grown in Oregon, is without a rival; is of the largest size, averaging, commonly, nearly an inch in diameter, of superior quality, unsurpassed for shipping or canning, and makes

a good dried product. The tree is vigorous and gives a regular and large yield, which brings the highest prices wherever offered. Our seedling, the Black Republican, has been well tested, and now has a national reputation; is large, of good quality, and a regular bearer of late fruit, which can be shipped across the continent. We have three other seedlings of great promise, which in size exceed all record, running from one to one and a third inches in diameter.

Our Bartlett Pears have always been in great demand. The tree yields regularly a heavy crop of the largest fruit of first quality, and has paid the grower a handsome dividend. This list might be extended. Perhaps enough has been said to indicate the fact that we have a fruit country.

The Italian Prune is a large, palatable fruit, a good shipper, and yields 33% when dried; making a showy black prune, excellent as a "confection" to eat out of hand; requiring little sugar, and of the finest flavor when cooked. The tree is free from all pests, stocky and vigorous; is a regular bearer, carrying its fruit well distributed, and requiring no thinning; remarkable in the respect that it sheds all fruit it cannot perfect to a good size, according to the dryness of the season. The tree responds to good treatment, but does tolerably well in the grass plot and under neglect, and has been called "the poor, shiftless man's tree." This prune brings in the Eastern markets two cents per pound more than any other prune grown on the coast, and is favorably known as the "Oregon prune," and is destined at no distant day to be a leading commercial export. But it is pertinent and proper to say that much talk and many published statements about large yields and net profits of from five to seven hundred and fifty dollars and upward, per acre annually, notwithstanding they are true, are misleading and should not be considered in a business proposition. These are rare and fortunate exceptions in favored localities, under exceptionally favorable circumstances, and will not apply to the general grower. One, two or three hundred dollars per acre net returns annually, according to the locality and orcharding skill, and pecuniary ability of the man, is good enough. This is a reasonable, conservative estimate, which may be relied upon, leaving the rest to the possible, and the hopeful dream of the visionary. Our prune industry is now of considerable importance commercially. Many young orchards are coming into bearing, and a large area will be set to this fruit the coming season. This is now the leading fruit product of Oregon, and will continue to be so.

Sheep and Wool Industry of Oregon.

By James Withycombe.

Oregon is peculiarly adapted to sheep farming, although this industry is but slightly developed as yet. The soil, climate, and vegetation are such that sheep of every breed not only thrive here, but almost invariably improve, especially in the quality of the wool. The Cotswold finds as congenial a home in the Willamette Valley as its native home in the hills of Gloucestershire. Merinos, and the different families of the Down breeds, can all find locations that are equal if not better suited to them than their native homes in Europe.

Countries that are unsuited to certain breeds of sheep, when those sheep

are kept there for a few generations they lose their original characteristics and rapidly deteriorate, but such is not the case here. The first sheep were brought to this State in 1842, and at the present time there are probably two million sheep in the State; but even this number is very small compared to what could be easily kept. Between the years 1848 and 1860 some very fine specimens of Australian, Saxony, French and Spanish Merinos were brought to the State, which soon very materially improved the quality of Oregon wools. From 1860 to the present time the mutton breeds have been repeatedly brought here, until now we have choice specimens and flocks of Cotswolds, Liecesters, Lincolns, Devon Longwools, Improved Oxfordshires, Shropshires, Oxford-Downs, South-Downs and Dorset-Horned.

Fortunately for the sheep industry of the State, the pioneer sheep-breeders were a very progressive class of farmers, and in making their selections for breeding stock were very particular in procuring sheep of great individual merit. With the very best of individuals to start with, and the diversity of soil at the command of the breeder, it was an easy matter to select such a location as would be suitable for the raising of any breed of sheep that the breeder might prefer. It is well known among practical sheepmen that while certain soils and climates might be suitable for some breeds of sheep, other breeds would require quite different conditions to be successfully kept. Probably there are few, if any, countries that can boast of offering better inducements to sheep men than this State. Oregon has two different climates. The Cascade Range of Mountains divides the State into what is known as Eastern and and Western Oregon.

The western portion of this State is mainly a rich alluvial soil, and its richness is remarkably uniform over the prairies, low and high lands. Winter is the rainy season, seldom much freezing or snow, and sheep can nearly always find plenty of grass or fall grain to keep them in excellent condition throughout the entire winter. The rich alluvial soil of the western portion of this State is impregnated with large quantities of silicates. Such soils are supposed to favorably influence the lustre and softness of wool. Wools grown in Western Oregon, as a rule, are very soft and lustrous, evidently due to the climate and soil. Oregon wool was awarded three medals at the Centennial Exposition, and was very highly praised for its superior quality by some of the most expert judges of wool in the world.

The agricultural land in Western Oregon is principally utilized for grain raising, and sheep are a secondary consideration. They are kept in small flocks, principally for weed exterminators on the summer fallows, and for general scavingers Successful farmers claim that they can keep one sheep to every two acres of wheat land, and grow more wheat than they could without them. The grain farmers bestow but little care and labor upon their sheep. In the summer they roam over the summer fallow, in the fall on the stubble ground, and winter in the pastures, meadows and fall wheat. The fall wheat is usually sown in September or October. It grows very rapidly, and often gets large enough to turn sheep on it by the first of December, affording an abundance of pasture until the middle of March or first of April. The farmers realize that their sheep are good paying stock, and with a little better man-

agement could be made much more profitable than they are at present. Mutton sheep in the winter are worth five cents per pound gross, and it costs the farmer but little to produce mutton, as the sheep are fattened principally on the fall-sown grain.

Sheep are remarkably prolific in this State. Small flocks of ewes will frequently raise 150% of lambs, and it is not an infrequent occurrance to see ewes scarcely one year old raising two lambs.

Eastern Oregon is that portion of the State situated east of the Cascade Range of mountains. The soil in this section of the country is mainly a sandy loam, mixed with volcanic ash, and slightly impregnated with alkali. It is a large open country, affording valley, plain and mountain range. The valley lands are exceedingly fertile, usually well watered, and are mainly utilized for growing hay for the winter feeding of the flocks. Alfalfa grows luxuriantly on the greater portion of these valley lands, and in favorable seasons two or three large crops of hay can be procured on irrigated land, which is almost invariably of excellent quality. The climate being dry, consequently the hay can be nicely cured.

Sheep farming is conducted quite differently in this section of country than in the western portion of the State. The flock-master usually selects a piece of valley land that is well watered for the homestead, a creek bottom preferred. This land is expected to produce sufficient hay to feed the flock for at least one month in the winter, which is as long as the average winter lasts. Sometimes the homestead will include a large spring, the water of which will be all used up on the farm for irrigating, etc., and this may be the only water around for some distance. In those cases the rancher practically monopolizes a large tract of government land by practicing the game of what is known as fencing the water in, and thereby securing a large tract of land for winter pasture, as in the summer months stock on the range do not graze on such lands, owing to the distance from water.

In the eastern portion of the State sheep are kept in large flocks, and wool has been heretofore the primary consideration; but recent years, owing to the increased value of mutton, more attention has been paid to increasing the size the sheep. The flocks, except the rams, are driven to the mountains after shearing, which is usually done in May. In the summer months the Cascade and Blue Mountains furnish an abundance of fresh, tender, and nutritious grasses; and these ranges are well watered with pure cold water from springs that are supplied by the melting of snow on the high peaks of the mountains above, which combine to make those sections a veritable summer paradise for sheep. The flocks are guarded by a herder, about two thousand in a flock, and each herder is accompanied by one, two, or more sagacious shepherd dogs. The outfits for these herders are crude and simple, consisting of a tent, frying-pan, coffee pot, a tin cup or two, and a plate or two of the same material; shot-gun or rifle, an axe, and a big jack-knife. Their stores contain bacon, flour, beans, and coffee, and occasionally a few cans of fruit, etc. These herders, during their summer sojourn in the mountains, seldom see any person except the owner of the flock, or his superintendent, who visits the herder once or twice a month, bringing him his supplies, and arranges for the removal of the

flock to fresh pastures as often as necessary. Occasionally the monotony is broken by a visit from a harmless cinnamon or black bear, which affords a little amusement for the herder, to witness bruin bite the dust, due to a bullet from a well-aimed rifle. The position of herder, to be successfully filled, requires a person of tact and judgment. There is something more to do and think about than merely to trail after the sheep and see that none get lost. The herder should be keen of perception, and know when his flock is doing well, and thoroughly acquaint himself with the peculiarities of his flock and their surroundings The return of the flocks in the fall reveals the good or bad qualities of the herder. The good herder will have his sheep fat, and the percentage of loss will be small, while the poor herder will have his flock thin and the percentage of loss great.

The sheep are brought out of the mountains in the fall; about October. The lambs are separated from the ewes and placed in charge of another herder, and are grazed on the best parts of the range in the vicinity of the homestead. If the owner wishes to dispose of any fat ewes or wethers, they are drafted and sold, although the general practice is to sell the wethers after shearing. Buyers usually contract for them at a certain price, to be delivered immediately after shearing. The shearing is usually done by professional shearers, who travel from farm to farm, shearing the different flocks at so much per head. These men are quite expert in the business, often turning off one hundred head to the man in a day, which is very good work on Merino grades. The wool is sacked and hauled to the nearest railroad station, and is sometimes sold there to a local buyer, or consigned to commission merchants at The Dalles or Portland, and occasionally shipped to San Francisco or the East. Merinos, or their grades, are the principal breeds kept on the range. They withstand the hardships that they are occasionally exposed to better than the mutton breeds. They will herd better, and keep healthier in large flocks than any other breed. The density of their fleeces, and their oily condition preserve the fiber, and protect the wool from injury by dust.

Sheep farming in Eastern Oregon would not have been very profitable for the past few years if those who are engaged in it had to depend on wool alone, owing to the very low price of that article. But, fortunately, mutton has been in good demand at very satisfactory prices, which has materially helped to swell the receipts of the flock owners.

The Umpqua and Rogue River Valleys are eminently adapted to the growing of fine wool. The climate is mild and dry, and the surrounding country is hilly, which are the most favorable conditions for Merino sheep. The grasses are of short growth, fine, and very nutritious. Those valleys are exceedingly fertile, producing abundant crops of grain, grasses, and alfalfa. The winters are not so wet as in some portions of Western Oregon, or as cold as in Eastern Oregon. The mildness of the climate, with the nutritious grasses, makes this portion of the State well adapted to the growing of very fine Merino wool of the Australian or Saxony type. The Umpqua Valley wools were formerly quoted higher than any other Oregon wools, but in recent years the fine wools of this section have deteriorated, owing to the crossing of the flocks with the mutton breeds.

Oregon offers great inducements to the practical sheep breeder. All sections of the State are eminently adapted to growing certain classes of wool and breeds of sheep Western Oregon, with its rich alluvial soil, producing abundant crops of native and British improved grasses, clovers, roots, and grain, of unexcelled quality, makes an agreeable home for the improved mutton breeds. The mutton breeds of sheep thrive remarkably well here. It is not an uncommon thing to see Cotswold breeding ewes weighing two hundred and fifty pounds, and yearling rams have often reached this weight. Wool grows of a very uniform fiber, and of great length. on the long-wool breeds. Staples of wool twelve and sixteen inches long are not unusual.

Eastern Oregon is preëminently a pastoral country, where, in certain sections, flocks can roam over large areas, and the character of the soil and climate is such that sheep are very healthy, and keep in good health in very large flocks. With ordinary care the percentage of loss is very small, and the increase large. Flocks containing its thousands have averaged ten to eleven pounds of wool per head.

The outlook for the sheep industry in this State at present is very flattering. The ruling prices for mutton for the past two years have been very good, and while wool has been a little low, still. with heavy fleeces and good prices for mutton, sheep men have been prosperous, and are likely to be so for some time.

LAND.

In every county of the State there is more or less government and school land yet open for entry, besides, in many counties, railroad land, which may be purchased at reasonable prices per acre. Improved land may be bought from present holders at prices ranging from ten to one hundred dollars per acre, according to the location and amount and quality of improvements. The school land belongs to the State, and is sold at one dollar and twenty-five cents per acre. It is proper to say that the best government and school land is already taken, especially that which is within easy reach of railroads or other transportation facilities. There is a vast quantity of government land, and considerable school land, unoccupied in the northeastern, eastern, and southeastern parts of Oregon, which is of excellent quality for agriculture and grazing. The greater part of these sections is far removed from railroads and navigable streams, which accounts for their being unoccupied, though nearly all of it is used in common by herds of horses, cattle, and sheep. The following tables show the surveyed and unsurveyed vacant public land in Oregon by land districts. It must be borne in mind that a large portion of all this is rough, hilly, or mountainous, and much of it valueless for anything except for the mineral deposit which it may contain:—

THE DALLES LAND DISTRICT.

John W Lewis, Register; Thos. S. Lang, Receiver; The Dalles, Oregon.

The following is a copy of the official report of surveyed and unsurveyed lands in this District, corrected to June 30, 1892:—

Unsurveyed and not embraced in Indian or other reservations.

County.	Acres.
Wasco	185,000
Sherman	1,900
Gilliam	35,300
Morrow	
Grant	14,000
Crook	135,600
Total	371,800

Number acres surveyed and open to settlement:

County.	Acres.
Wasco	747,370
Sherman	85,000
Gilliam	435,000
Morrow	200,000
Grant	400,000
Crook	2,300,000
Surveyed lands, open	4,167,370
Unsurveyed	371,800
	4,539,170
In grant to D. M. R. Co.	300,000
W. V. & C. M. W. R. Co	150,000
Total	450,000

HARNEY LAND DISTRICT

J B. Huntington, Register; Harrison Kelly, Receiver; Burns, Oregon.

County.	Acres surveyed.	Acres unsurveyed.
Crook	18,880	
Grant	1,107,217	233,074
Baker	200,598	37,057
Malheur	1,937,526	1,362,720
Harney	2,357,337	380,160
Total	5,621,558	1,013,011

LA GRANDE LAND DISTRICT.

Alonzo Cleaver, Register; A. C. McCelland, Receiver; La Grande, Oregon.

County.	Acres surveyed.	Acres unsurveyed.
Baker	740,715	225,600
Grant	1,363,887	14,080
Morrow	240,720	
Union	1,045,452	371,100
Umatilla	907,074	95,526
Wallowa	618,612	799,988
Total	4,916,460	1,506,294

OREGON CITY LAND DISTRICT.

J. T. Apperson, Register; Peter Paquet, Receiver; Oregon City, Oregon.

County.	Acres surveyed.	Acres unsurveyed.	Total.
Multnomah	22,360	60,000	82,360
Columbia	10,390	30,000	43,390
Clatsop	9,000	288,000	297,000
Tillamook	160,000	253,000	413,000
Washington	6,600	57,600	64,200
Yamhill	25,000	----------	25,000
Polk	22,600	69,000	91,600
Benton	64,800	121,600	186,400
Linn	68,200	506,800	575,000
Marion	11,600	500,000	511,600
Clackamas	47,400	445,000	492,400
Total	447,950	2,331,000	2,778,950

The above public lands are principally covered with timber and brush, some good agricultural or farming lands when cleared; a great deal rough, broken, mountainous land, chiefly valuable for the timber thereon, and subject to entry under the Timber and Stone Land Act of June 3, 1878.

ROSEBURG LAND DISTRICT.

Statement of approximate area of unsurveyed land not embraced by military or Indian reservation in each county comprising the Roseburg, Oregon, land district:—

County.	Acres.
Linn	315,520
Benton	38,720
Lane	1,408,500
Douglas	1,467,800
Coos	396,537
Curry	706,750
Josephine	769,900
Jackson	374,490
Klamath	231,470
Total	5,709,687

Statement of approximate area of public lands subject to entry or filing in each county comprising the Roseburg, Oregon, land district:—

County.	Acres.
Linn	21,679
Benton	21,561
Lane	390,761
Douglas	320,788
Coos	155,787
Curry	98,136
Josephine	79,097
Jackson	346,549
Klamath	10,960
Total	1,445,318

LAKEVIEW LAND DISTRICT.

J. W. Watts, Register; C. M. Snider, Receiver; Lakeview, Oregon.

County.	Acres surveyed.	Acres unsurveyed.
Lake	2,626,187	285,000
Klamath	1,298,993	396,000
Harney	1,443,029	572,000
Malheur	1,006,508	968,000
Crook	1,114,716	
Total	7,489,733	2,221,000

RECAPITLATION.

District.	Acres surveyed.	Acres unsurveyed.
Harney	5,621,558	2,013,011
La Grande	4,916,400	1,506,294
The Dalles	4,729,560	380,100
Oregon City	447,950	2,331,000
Roseburg	1,445,318	5,709,687
Lakeview	7,489,733	2,221,000
Total	24,650,579	14,148,092

The foregoing figures were furnished by the several Registers of the different land districts, for which the Board feels under obligations.

CRANBERRIES.

Mr. C. D. McFarlin, of Empire City, Coos County, writes concerning the culture of cranberries, and says: "I came to Coos Bay in the spring of 1885 to try the experiment of cranberry culture, but want of money made it necessary for me to go at it in a small way. I prepared about twenty acres of land in the summer of 1885. Between that time and the spring of 1888, I made three shipments of vines from Cape Cod, all of which, owing to want of knowledge of how and when to ship, came to me dead, or at least so nearly dead that not more than 1% of them lived, and those which did live got a backset, as they were so nearly dried out. Previous to 1888, I had made the most of the few Cape Cod vines that survived, and as soon as they had sufficient growth to furnish cuttings, I cut and planted the cuttings, so that I had about one and one-fourth acres planted in 1888. These were the Cherry variety of the Cape Cod berry.

"In the spring of 1888 I got from Mr. Burr, of Olympia, Washington, I believe, twenty-two barrels of vines. They came in good shape, and I planted about one and three-quarter acres with them, and put the rest out in the natural meadows for future use. Of these I don't think I lost a single hill. They have made good growth, and I got some berries from them this fall (1891). These vines from Mr. Burr were imported from New Jersey, and were

also of the Cherry variety. From the Cape Cod vines I gathered this fall (1891) six hundred bushels. From one and one-quarter acres of the Burr vines I gathered one hundred bushels. Next year the Burr vines will be of a bearing age, and I expect a big crop from them. During all of this time I have been experimenting with different varieties in a small way, getting my vines from Cape Cod through the postoffice, but I find I have not procured the right variety for my location. I am only three miles from the coast, and am exposed to the trade winds in summer, and cannot get the proper color on the Cherry berry. I have a variety that I don't hesitate to say will beat the best Cape Cod berry. I was raised on Cape Cod, and have cultivated berries there. The berry I refer to is a nameless berry, but I have called it the Black Diamond on account of its peculiar shape and color. This berry, so far as I have tested it, is the best for the sections near the coast where it is exposed to the cold winds of summer. I presume some other variety will do better further in the interior, where it is sheltered from cold winds. I planted the Black Diamond last spring, and have ordered the same for my next spring's planting, except one barrel of vines of the McFarlin variety. I have a few hills of this latter variety of bearing age. They seem disposed to rot on the vines in this climate; only for that fact I should plant this variety. I shall know in three or four years what this berry will do here. If I were thirty miles in the interior, I should cultivate the McFarlin variety.

"I believe I am working on an infant industry on this coast that is destined to grow to be a giant; and I believe from experience it is of the greatest importance to start right. To that end, one of the principal features of a proper start is the proper variety of plant. I obtained last spring about twenty hills each, through the mails, of the following varieties: Early Black, Shaw's Success, Belle of the Cape, Champion, Black Vale, and St. Clair Improved. It will be three or four years before I can tell how any of them will do here. At present the vines are looking well. I have about six acres in vines. I plant each year what I can without hiring too much help. I will have next year three acres out of the six old enough to bear a full crop. The soil must be muck, or peat, capable of being drained eighteen inches below the surface from May 1st to November 1st. It must be fresh marsh, or swamp, free from clay or loam. A coating of absolutely pure sand is almost absolutely necessary to success. Better if it can be overflowed a foot deep all winter. Such land can be bought at ten to twenty dollars per acre on Coos Bay at present. The running cost of taking care of an acre, after it is properly made, is very light—perhaps not to exceed twenty dollars per annum.

"The cost of gathering, boxing, and getting berries to San Francisco is one dollar per bushel. I got three dollars and fifty cents per bushel last year. This year, some of my berries sold as low as two dollars and fifty cents per bushel, but they are low this year on account of the largest crop East that was ever known. My berries are selling now (October 24, 1891) in San Francisco, at three dollars and twenty-five cents per bushel. It is safe to estimate three dollars per bushel as a fair price for the future. My meadow has cost me over one thousand dollars per acre to buy it, make it into condition, and get a bearing vine.

"A Miss Chabot, of Oakland, California, has one hundred acres of bearing vines in Washington. I have been told it is near the coast, a little ways above the mouth of the Columbia River. Her berries were in the San Francisco market this fall.

"If any one wants to go into the business of cranberry culture I would advise him by all means to get the best book on the subject and read it carefully. The process is so different from any other kind of farming, that unless one is either read up or has had experience, he is almost sure to make a failure. If any one wants to get vines from the East this is the time of year (October, 1891) to do it. *I have found this out at great cost.* If any one wants vines, you are free to give them my name and address, and I will put them in correspondence with reliable men in Massachusetts who will furnish them."

PROPHYLAXIS OF THE CLIMATE OF OREGON.

By C. H. HALL, M. D., PROFESSOR OF PATHOLOGY AND PRACTICE OF MEDICINE IN MEDICAL DEPARTMENT OF WILLAMETTE UNIVERSITY.

The earth's surface is divided into zones, the latitudinal limits of which are determined by the inclination of the plane of the earth's surface to the plane of its orbit. These conditions determine the climate of the several zones, influenced by local and general causes. The *peculiar* features of the Oregon climate finds its explanation partly in the peculiar chorography of the country, and partly from the effects of the great Japan current of hot water—the Kuro Siwo—which results from two currents of heated water from the Indian Ocean; one passing through the straits of Malacca and the China Sea, and the other skirting the eastern coast of the Phillipine Islands, at the northern extremity of which they unite, opposite the Japan Islands; this united current again divides; its main branch, tending east-northeast, strikes our Oregon coast off the mouth of the Columbia River. The waters of this current near its southern edge are 4°.3 hotter than those just outside the current. This vast amount of heat is expended on the coast line between Port Orford and Sitka. Within a variable distance of a few miles from the sea our Coast Range of mountains with a trend parallel to the coast line reaches from the Golden Gate to Vancouver's Island; while to the east of this range of mountains and parallel with it runs the Cascade Range at a variable distance of sixty to one hundred and twenty miles; while between these mountain ranges are the mild and fertile valleys of Rogue River, Umpqua and Willamette. Still further to the east are the high table lands bordering on the Columbia, John Day and Snake Rivers, whose streams water and drain this immense Inland Empire, while these mountain ranges give direction to the winds and furnish barriers to their force. In this vast country there is a variety of climate, modified by various degrees of altitude, ranging from the sea level at Astoria and south to Crescent City to an elevation of 4,258 feet at Little Meadows on the DesChutes, and in all this variety of position the mean annual temperature of the northern part of Oregon is 52°.4; mean annual temperature of the southern part is 52°.2; mean annual temperature of Eastern Oregon is 48°; mean annual temperature of Western or Coast Oregon is 49°.

At Portland, in latitude 45°.30, the mean summer temperature is 64°.8, although there are occasional days when the thermometer registers 100° in the shade for a few hours in the afternoon, but falling rapidly at the approach of night. The winters in the interior have a great variety of temperature. It is very rarely that the ground is frozen or that snow lies on the ground for any length of time, and yet the thermometer has been known to stand at —15° in the Willamette Valley, with a mean elevation of three hundred and eighty-two feet above the sea, and 3°.3 in the Umpqua, with an altitude of four hundred and fifty-eight feet. This variety of altitude gives great variety of climate in different localities, but a very stable climate in the same places.

Mean summer temperature at Roseburg, 64°.2; mean summer temperature of State, 64°.3; extreme summer heat at Roseburg, 102°; extreme summer heat of Oregon, 105°; mean winter temperature at Roseburg, 41°.6; mean winter temperature of Oregon, 40°; extreme winter temperature at Roseburg, —3°.3.

During the summer months the prevailing winds are from the north during the morning hours, but almost every afternoon a strong breeze sets in from the West, directly from the sea, until nightfall, when the breeze turns back from the East, and thus three times in every twenty-four hours the winds have disturbed the malarial and septic influence or disease germs, and so diluted them with atmospheric currents that their influence is almost nothing. It seems to be a fact that the western coasts of all continents have a milder climate than the corresponding eastern exposure; in fact, latitude has but little to do with local temperature in Oregon. Astoria at the mouth of the Columbia has a mean annual temperature of 54°, while a degree further north on Puget Sound has a temperature of 58°.5. Frost seldom penetrates the ground, and it never snows at Astoria, though snow sometimes falls in the Willamette Valley, but rarely in the Umpqua or Rogue River Valleys. The winters in the region of the "table lands" of the eastern part of the State vary in degrees of cold. The climate is dry, and when snow does fall it is blown about by the warm Chinook winds coming over the hot springs of the interior, so that it soon disappears and scarcely arrests the progress of the green growing grass of the elevated plains. At Dalles City on the Columbia, and almost ninety miles east from Portland, the climate is influenced by the winds sweeping north from the great burning plains of Lower California and Mexico. The range of mountains which stretch along to the east of the Sacramento and also to the east of the Willamette, intercept the moisture from the sea, and precipitates it in rain in the western part of the State; while the eastern part during the winter months is "high and dry," and warmed by the winds which sweep up from the south, and meet the colder currents from the Rockies and send their perpetual winter rains to the region of Puget Sound and the Straits of Juan de Fuca. Under these influences, while Western Oregon has a very moist climate with at least three changes of winds in every twenty-four hours, except during the prevalence of a southern gale which brings our usual warm winter rains, yet, under all the genial influences of this most delightful climate, it is possible to find within the range of a few miles every modification of temperature. At Fort Klamath, in the extreme southeastern part of the State, the thermometer has recorded —34° in winter at an altitude of 4,108

feet above the sea, while in the valley of the Rogue River, one hundred miles west, the fields at the same time would be green with growing grass.

The isochimenal line from St. Joseph, Missouri, to the Pacific, traced by Captain Mullen of the United States Army, is somewhat wonderful in its deflections. "This line, which leaves St. Joseph in latitude 40°, follows the general course of the Platt to Fort Laramie, whence it tends northwesterly, crossing the Rocky Mountains at 47°; still further westward it goes up to 48th parallel and spreads out over the plains of the Columbia, 8° north of its initial point." Captain Mullen further says: "It would seem natural that the large volume of air in motion between the Wind River chain and the Black Hills must receive a certain amount of heat, as it passes over the line of hot, boiling springs here found, which, added to the great heat evolved from the large volumes of water here existing, which is constantly cumulative, must all tend to modify its temperature to the extent that the thermometer indicates."

The prevalent direction of the winds, the physical face of the country, its altitude and the large volume of water in the Pacific warmed by the hot current from India, all doubtless enter to create this modification; but whatever produces it, it exists as a fact that must for all times enter as an element worthy of every attention, that this is one of the mildest and most healthful climates under the sun.

The influence of the Japan Current upon our western coast is more feeble on account of the greater mass of intervening ocean water than the influence of the gulf stream in the Atlantic upon the European coast, and therefore less potential in directly elevating temperature. Then the narrowness of the strait through which the Arctic Ocean discharges its ice floes into the Pacific is so marked when compared to the vast open Polar Sea on the Atlantic side, that the heat of the Japan Current is much less affected by the limited number of ice peaks than the Gulf Stream on the western coast of the eastern continent. There are very marked variations from the coast climates of Europe and our Pacific climate. Then, again, the projecting peninsula of Alaska, with its outlying islands, deflects far to the westward the reactionary Arctic Currents, and protects our western climates from their depressing influence. The southeast winds, laden with moisture from the tropics, prevail along our coast during the wintertime and modify our climate, while during the summer months we have a prevailing north wind to modify the heat of summer. Then, again, the hurricanes generated in that mighty cauldron of atmospheric forces—the Gulf Stream—are hurled across the narrow volume of the Atlantic with a force sufficient to be severely felt upon the coast of Europe. Storms entirely analagous and accompanied by electric changes equally marked prevail upon the Asiatic coast, and have been traced some distance along the Kuro Siwo; but the mighty mass of the Pacific waters calmly absorbs their fury and prevents their disturbing force from reaching our shores. The atmospheric changes of the Pacific Coast are consequently more uniform and of minor range. Comparing the averages of winter and summer temperature along the isothermal line of 50°, the variation of the Atlantic side are found to be double those of the Pacific. The mean range of winter from the mean of July on the Pacific Coast is only 8°.3, while the variation at Washington, D. C., is 44°.3,

or more than five times as great on the Atlantic as it is on the Pacific. This absence of disturbing meteorological forces as indicated by this narrow range of barometric and thermometric oscillation is sufficient to account for our freedom from epidemics caused by atmospheric influences, and especially the absence of those atmospheric conditions favorable to the development of bacteria and all cryptoganic and sporadic germs. On account of the divers currents of air mingling with the breezes from the mild Pacific, contagious and epidemic diseases are easily controlled, while such diseases as typhus and cholera are entirely unknown, and even typhoid forms of malaria are quite easily controlled, when compared with the same class of diseases in the climate of the Atlantic seaboard.

The climate of Oregon west of the Cascades is too damp for consumptives, but on the plateaus east of this range is the best climate for them in the world. Atmospherical causes of disease reside chiefly in the varities of atmospheric changes of moisture and temperature—sudden varieties of temperature, excessive moisture or dryness, different electric conditions or a deficiency of light. The atmosphere may be a source of disease in consequence of its being loaded with impurities—malaria, contagions of various kinds, and noxious gases in general, and an endless variety of septic germs.

The range of atmospheric temperature compatible with human life is very considerable. Its limits are probably just those extremes of heat and cold that belong to the lower strata of the air in different parts of the planet on which man is destined to exist. Under the burning sun of the tropics, and amid the profound frost of the polar regions we alike find human dwellers. These different degrees of external temperature impress indeed peculiar physical characters upon those who are subjected to them, but they do not of necessity extinguish or even cause disease. It requires more care, however, to preserve life under intense cold than under intense heat. In India the temperature ranges for a long time from 80° to 120°. We can form some estimate of this heat by remembering the oppressive effects of 80° or 90° of heat in our climate for a few hours in a single afternoon. Then the night brings a comfortable decline of heat, and refreshing breezes from the neighboring sea mingle with the dry air from the arid plains of the adjacent coast and destroy the germs of disease, or destroy their septic power by atmospheric changes. The mingling of the Arctic and tropical atmospheres here combine to produce an anomalous climate singularly free from the severer forms of diseases found in either of these zones. The gradual effects of great heat upon the human body operates distinctly as an exciting cause of disease, and gives rise to sudden attacks of illness. Persons who are exposed to the direct beams of a hot sun, especially during any labor or active exercise, are apt to be affected by what is called sunstroke, or *coup de solite*, or insolation. They fall down insensible, and often die in a very short time. This disease is common on the Atlantic border, but is entirely unknown in Oregon, though somewhat common in California. Tropical climates are subject to diseases of the most fatal character, both from the immense population to the square mile, as well as climatic exposure.

In the Arctic countries, on the other hand, where the sun appears for a short time above the horizon, and where the thermometer sinks to 40° and 50°

oelow zero, we still find inhabitants indeed, but they are few and thinly scattered, dependent mainly on the scanty supply of food in those parts of the world; but something also is to be ascribed to the depressing influence of extreme cold upon the vital powers. The deficiency of human food is itself owing to the restraining effect of low temperature upon organic life. Under a degree of temperature a little greater than that at the equator, or a little less than the lowest around the poles, it seems probable that men would soon perish, and in this fact we have a striking instance of the adaptation of the health-giving properties of a climate free from those extremes of heat and cold.

Closely connected with the effects of temperature upon the health is the influence of the different seasons of the year. It is open to the commonest observations that the general health of the community fluctuates with the changing seasons. Catarrhs and coughs and pectoral complaints of all kinds are most apt to commence or grow worse in the winter or spring months, while bowel complaints are more numerous and distressing in the summer months. The mucus membranes of the air passages sympathize with the skin under the agency of extreme cold; those of the stomach and intestines under that of continued heat.

The thoracic disorders are more serious and fatal than the abdominal. Cholera prevails where the temperature stands at a high grade for a considerable length of time, and proves fatal where cholera germs luxuriate in a hot and unchanging atmosphere. The climate of Oregon is entirely free from this disease for the simple reason that the germs of this particular form of disease cannot flourish in this mild antiseptic climate, with its everchanging currents of air drawn freshly from the mild Pacific Sea, and mixed three times a day with the gentle breezes from the table lands of the adjacent coast. After an experience of twenty years with the diseases peculiar to this climate, I have never seen or heard of a case of sunstroke, so common in Eastern climates, especially bordering on the Gulf of Mexico and the Atlantic seacoast. Yellow fever is also unknown in this climate, for the same reason; that is, our mild warm days are always followed by refreshingly cool nights, which makes the climate destructive to the germs which, in continuously hot localities, develop this remarkably fatal malady. And so it seems quite conclusive that the therapeutic of the climate of Oregon is remarkable in its effects, both as to its prophylactic agencies and its curative effects on all diseases peculiar to our race.

COUNTIES OF OREGON.

BAKER COUNTY.

By C. W. JAMES, ESQ., PRESIDENT BOARD OF TRADE OF BAKER CITY, OR.

This county is situated on the eastern border of the State, and contains 1,300,000 acres. It is is bounded on the north by Union, on the south by Malheur, on the east by Idaho, and on the west by Grant County. Its principal streams are Powder River and Burnt River. It is crossed diagonally from northwest to southeast by the Oregon Railway & Navigation Company's railroad, connecting with the Oregon Short Line and the Union Pacific. Its population is about eight thousand. The climate is healthful, without extremes of either heat or cold, and the soil is adapted to the production of nearly everything usually raised in a mild climate or temperate zone.

The elevation of this county is probably the highest in the State. The central part of it is known as the Powder River Valley, which is mainly devoted to farming and stock raising. The elevation being about three thousand feet above sea level, somewhat retards agriculture, and yet there is an abundance of Wheat and other grains produced, and the soil yields well. Vegetables of all kinds are grown satisfactorily, but Fruit does not flourish except in protected spots, and there will be found orchards yielding excellent Fruit, and in quantity averaging with bearing trees in any other portion of Eastern Oregon. Along Snake River, especially, where the low land there is protected by high mountains, the orcharding interests are quite extensive, and, of couse, profitable. Agricultural pursuits are growing rapidly as the county becomes settled and the demand being for the means of livelihood on small tracts. Stock raising naturally claims large areas, where Cattle and Horses can range at will for the year; and at a certain season the owners may drive them together—what they call "rounding up"—and brand and mark their increase, and then let them run again. Increase of population interferes with this. The husbandman takes up his piece of Government land, builds him a home, starts his plow, sows his seed, and then the drover and cow boy must mount their horses and push their herds further to the frontier. This process is going on in most parts of Eastern Oregon, and especially in Baker County, so that now it may be deemed pretty nearly as much an agricultural as a stock county.

Notwithstanding the altitude of most of Baker County, the seasons are not severe. The summers are pleasant, and as for the winters, "Cattle have grazed in some of the valleys for fifteen years without other food than that obtained by them on the ranges, and have never suffered serious loss. Generally, they are in good condition in the spring; but, occasionally, they suffer some deterioration. As on all ranges, a small percentage die every winter

from various causes. Running water is abundant in the streams fed constantly by living springs and melting snow of the mountains, and stock does not suffer for lack of water during the dryest season." The Wool interests of this county are important, as well as the raising of Cattle and Horses.

Baker City is the county seat, the commercial center and distributing point of Baker, Grant, Harney, Malheur, and a portion of Union Counties. It has a population of about three thousand, and has within its limits a street railway, electric power plant and light, gas works, two planing mills, a sawmill, capacity one hundred thousand feet daily. It is connected by a twenty-five-mile railroad with the great Blue Mountain timber belt of Sumpter Valley; possesses a fine depot, and city water works which is supplied from an artesian well affording an ample supply of pure water, the property of the city. There are two National banks, numerous mercantile houses, five churches, a public school second to none in the State, three newspapers, and an efficient fire department. Baker City is an important shipping point for beef, mutton, and wool to Portland and the Sound cities; timber, horses, and gold ores to the Eastern markets. It is the freight distributing point for Powder River and Eagle Valleys, and the mining districts of Seven Devils, Cornucopia, Sanger, Pine Creek, White Swan, Rye Valley, Mormon Basin, Malheur, and over the Sumpter Valley Railway to the mines of Grant and Harney Counties, Cracker Creek, Cabel Cove, Granite, Greenhorn, and Upper John Day mines.

The output of the quartz mines immediately tributary to Baker City, the past year, is estimated to have yielded three hundred thousand dollars in gold, and will be much increased the present year, as several new mills have recently been added to those already in operation in this district.

Many new and important mining enterprises are being inaugurated; and before the close of the year 1892, the output of bullion in the mining district adjacent to Baker City will be more than double the present production.

An important irrigation project, involving an outlay of six hundred thousand dollars, is now under way, which, when completed, will furnish ample water to irrigate all the arid lands of Powder River Valley. Another enterprise is projecting to utilize the waters of Rock and Pine Creeks to generate electric power to be transmitted by wire to Baker City. The parties who have undertaken this work feel assured of its early completion.

Baker County is enjoying a steady and healthy growth in agriculture, mining, and lumbering. It contains plenty of room for settlers, and numerous inducements for the investment of capital.

The value of all property returned for the purposes of taxation in 1891, was $3,198,157.

BENTON COUNTY.

This county lies on the Pacific Ocean, about midway of the Oregon coast, and is bounded on the north by Tillamook and Polk, on the east by Linn and Marion, and on the south by Lane. The Willamette River flows along its eastern boundary, and is navigable the year through to a point thirty-five miles south of the county. It is divided from north to south by the Coast Range, about one-third of the county lying on the east of the valley side of

the mountains. The eastern part has a gradual rise from the river to the foothills, ranging in distance from fifteen to twenty miles.

The western portion is more or less mountainous, but along the streams are fertile valleys, which are accessible and well settled and improved. From the summit, about midway of the county between the north and south boundaries, the Yaquina River rises and flows westerly and empties into the Yaquina Bay in this county. Near the same point, Mary's River rises and flows easterly into the Willamette at Corvallis. The Alsea River rises near the same place in the Coast Range, and flows southwesterly into Alsea Bay, in this county. These streams are rapid and clear, the Yaquina being navigable twenty miles above the bay, into which steamers enter and depart for San Francisco and other points regularly. Small vessels enter the Bay of Alsea, and do a fair shipping trade with the settlement in the Alsea Valley.

Along all these streams small farms are tilled, producing Wheat, Oats, Hops, all kinds of Fruit, Berries, and Vegetables. A part of the mountains and foothills is covered with a heavy growth of timber, consisting of Oak, Ash, Maple, Cherry, and Yew. Many of the foothills and a portion of the mountains are bare, and furnish excellent Grass and Pea Vine upon which stock feed and flourish. The land of these foothills and mountains clear to their tops, is fertile; the soil is deep and well adapted to Fruit and Berry growing.

In the main, Benton is an agricultural county. It contains some of the most beautiful, valuable and best improved farms in Oregon. Wheat and Oats are the leading cereals grown, but Barley, Rye, and Corn are produced to some extent.

The average yield of Wheat per acre is about twenty-five bushels, but fifty bushels per acre is not an uncommon yield under careful cultivation. The average yield of Oats is about thirty-five bushels per acre, though twice as much per acre is frequently grown. The export of Wheat from this county is about six hundred thousand bushels annually, and of Oats about two hundred thousand bushels. Excellent Hops are grown quite extensively, and the industry is being rapidly developed. A great variety of Garden Vegetables is grown, the generous soil bestowing a vigorous and abundant development. The soil, climate, and water are especially encouraging to dairying, and those who are engaged in this branch of our varied industries, find it pays well. Some good dairy stock has been added to the county breeds. Experienced dairymen can find here a splendid field for the establishment of a remunerative business.

This county, in fact the entire Willamette Valley, on account of soil and climate, is well adapted to the growth of Fruit. All varieties of Apples grow thriftily. Pears of the finest flavor and large size are grown. Prunes, Plums, Peaches, Cherries, and all kinds of Berries, reward the orchardist and gardener. It is pretty accurately estimated that the hills and low lands of Benton County will yield a net profit to the Prune grower of three hundred dollars per acre. In fact, a strip of country along the coast fifty miles in width through the entire length of the State is destined to become one of the greatest Fruit producing regions in the world. This industry has not been prosecuted to any

great extent until recently. New orchards are now being set out and old ones revamped, and horticulture is becoming one of the wealthiest industries of Oregon.

The timber resources of Benton County are extensive. Along the coast there is considerable Bull Pine, Sugar Pine; along the ridges and on the table lands of the Coast Range in the northern part, Yellow Fir is plentiful; in the eastern part and also on the western slope of the Coast Range, Cedar, excellent finishing lumber and shingles, is valuable and extensive.

This county also possesses valuable mineral resources, for a full account of which see the chapter on "Mines and Mining," *ante*, page 11.

In the matter of fisheries, Benton County ranks well; Oyster and Salmon fishing in Yaquina Bay, and Salmon fishing at the Alsea; deep-sea fishing is carried on from the mouth of the Yaquina Bay, and large quantities of Cod, Rock Cod, Red Groopers, Kelp, Sole, Halibut, etc., are taken. Last year about one hundred tons of Salmon were taken, put up, and shipped from Yaquina and Alsea Bays. There are four canneries on the two bays, and their annual pack averages eleven thousand cases of forty-eight pounds each, averaging about five dollars per case. They furnish employment to about two hundred men. A large quantity of Salmon is shipped to San Francisco and Portland for table use as fresh fish. Herrings, Flounders, Perch, Bass, Crabs, Clams, and Rock Oysters abound in the bays, and on the beach and in the rocks of the seashore.

The inhabitants of the foothills and farmers of the county are also devoting considerable attention to stock raising. The entire Coast Range is well adapted to the stock industry. Good grass grows the year through, and the winters are so mild that stock feed exclusively upon the range.

Beekeeping is an important industry in this county, and the quality of Honey produced is as good, if not the best, that is produced anywhere on earth. The best Honey is produced in the mountains of the Coast Range, and especially in the neighborhood of Alsea and Yaquina Bays.

Manufacturing is represented in this county by the production of Lumber, Sash and Doors, Furniture, Ship-building, Brick, Machinery, Leather, Flour, and Feed, and Dried and Canned Fruits.

In the matter of transportation facilities, Benton County is most fortunately situated. It has communication with Portland by the Willamette River and the Southern Pacific Railroad; with San Francisco by the Oregon Pacific Railroad connecting with the Southern Pacific at Albany, Linn County, and the Oregon Pacific to Yaquina Bay, and from thence by steamer to San Francisco and all parts of the world. The Oregon Pacific is destined to be a through line to the East; is now completed eastward to the base of the Cascade Mountains, and work is still in progress.

Corvallis is the County Seat, situated on the west bank of the Willamette River, about midway between the northern and southern boundaries of the county. It contains about two thousand five hundred inhabitants; is lighted by electricity; has a street railway, two flouring mills, with improved machinery, each with a capacity of two hundred barrels a day, extensive lumber mills, iron foundry, etc. There is a sash and door factory, an extensive new

carriage factory, the usual mercantile houses in a thriving town, a fine court-house costing seventy-five thousand dollars, and many elegant and costly residences. It has an efficient volunteer fire department, waterworks, with a capacity of one million gallons per day, and a telephone system in the city, and connects with Philomath, six miles distant. Its streets are broad, beautifully shaded, and are kept in good condition. It is the seat of the State Agricultural College, a creditable institution, having in connection the United States Experiment Station for Oregon. There is an excellent, commodious, and modern public school building, costing twenty thousand dollars, in which school is kept ten months of the year. The Corvallis College, established by the M. E. Church South, is a good school, and there is also a kindergarten school in the city. There are three weekly newspapers published — the *Gazette*, the *Times*, and the *Leader*. There are three banks; Christian, Presbyterian, Evangelical, Congregational, Methodist, M. E. Church South, Catholic, and Seventh-Day Adventists Churches; has lodges of Odd Fellows, Masons, Knights of Pythias, and A. O. U. W. The town is steadily growing, new business houses are being erected, and public improvements continually made.

Yaquina City is the terminal town of the Oregon Pacific, and is situated on the Yaquina Bay, about four miles from the mouth of the harbor. It is a thriving town of some five hundred inhabitants, and is only waiting the completion of the railroad to its eastern connection, and the marketing of its lots, which are owned by the railroad company, and have been hitherto withheld from sale, to bloom into a seaport city of importance.

Newport is situated at the mouth of the Yaquina Bay, and has about five hundred inhabitants. It is a great summer resort, thousands of people from all over the State spending the summer months here. Between the towns of Newport and Yaquina, along the bay shore, a number of small towns have been laid out and platted, and it is expected that in the future the whole distance will be the site of a city of importance.

Monroe is a village of some importance in the southern part of the county, and is on the line of the West Side Railroad, which is expected to be completed this summer. It is the trading point of a considerable scope of country.

Philomath is situated about six miles west of Corvallis, on the Oregon Pacific. It is quite a trading point, and is the seat of Philomath College, an institution conducted with success by the United Brethren Church.

King's Valley, Summit, Wells, Toledo, and a number of stations on the railroads, are small villages, forming convenient trading points for the people in their respective vicinities.

The value of all property in Benton County returned for the purpose of taxation in 1891 was, $5,401,102.

CLACKAMAS COUNTY.

Clackamas County is in the northern part of the Willamette Valley. It lies on both sides of the Willamette River, and extends eastward to the crest of the Cascade Mountains. It has an area of about one thousand five hundred square miles,—considerably larger than the whole State of Rhode Island,—

and it is capable of sustaining a greater population than the midget State. It had nine thousand two hundred and sixty inhabitants, according to the census of 1880, and in 1890 it had fifteen thousand two hundred and thirty-three, a gain of more than sixty-three per centum in the decade.

Being one of the Lower Willamette Valley counties, and reaching from the river to the mountains, it naturally follows that Clackamas must have a considerable variety of surface characteristics and natural productions. It has a wide range of farm products. Its timber is abundant and valuable. It has large mineral wealth, only a small portion of which is under development;—the Oswego Iron Mines, which are being worked by one of the biggest manufacturing concerns on the Pacific Coast;—indeed, in the volume and value of its manufactures, Clackamas County ranks second of the counties of the State,—the first being Multnomah, which contains Portland, the metropolis of the Northwest.

Besides the Willamette River, the Clackamas, the Molalla, and the Pudding, are important streams flowing from the eastward; and the valleys of all of them are uniformly rich and well suited to agriculture. There are no better lands anywhere than in these river bottoms. The soil is of surpassing richness, and is easily tilled. Back a little from the streams is what is known as second bottom land; that is, land possessing most of the characteristics of that bordering on the streams, but somewhat drier and suitable to the production of crops that might be injured by excessive moisture. Still further back is upland of all grades to the most mountainous. Of course, there are many secondary water-courses, and on the ridges separating them is fine farming and grazing land, the soil in general being rather of a clayey nature. It is only on the Cascade Mountains, in the eastern part of the county, that the very rough land is met.

All the common farm crops are grown except Indian Corn. The very hot, dry weather necessary to the successful production of that cereal is lacking here. Wheat, Oats, Barley, Buckwheat, various grasses, Peas, Beans, Potatoes, and other root crops, Melons, Strawberries, Grapes, Currants, Blackberries, Raspberries, Cherries, Plums, Prunes, Pears, Peaches, Apricots, and Apples of all kinds, are among the productions of Clackamas County. Vast quantities of Hops are also raised. The only Teasel farm west of the Mississippi River is in this county. Fruit, Wheat, Hops, and Potatoes may be named as the most important agricultural productions of the county. The fruit raising industry is probably the most susceptible of expansion. The small prairies in the central and southern parts of the county cannot be surpassed in the advantages they offer for the raising of Peaches, Prunes, and small fruits. Others flourish there, of course, but these are particularly mentioned, because they are generally regarded as the most profitable and as affording basis for the rapid building up of a great industry.

The live stock interests of the county are important. Cattle raising is not conducted here on the same plan that characterizes the range stock business east of the mountains. The farmers have the stock here,—Horses, Cattle, and Sheep,—and they get a considerable item of revenue from that source. There were 4,808 Horses, 13,164 Cattle, 11,633 Sheep, and 5,405 Swine on the assess-

ment roll for 1891, and these did not include those who had but two or three head apiece that were exempt from taxation. There were 458,452 acres of land assessed. The valuation of all the taxable property in the county for that year was $6,350,250, which is generally understood to be not more than one-third the true valuation. In 1888 the gross valuation was but $3,911,555.

In timber and minerals, Clackamas county is rich. The principal varieties of timber are Red and Yellow Fir, Cedar, Oak, Ash, Maple, Alder, and Cottonwood. These woods are worked up into lumber, shingles, pulp, and excelsior. The supply is practically unlimited. The numerous streams afford a cheap and reliable means of getting the timber from even the roughest hills to the mills and to market. There is Iron at many point in the county. An Iron-manufacturing plant costing nearly $2,000,000 is in operation at Oswego, getting all its Iron from the adjacent hills. On the opposite side of the river, and only about two miles from Oregon City, a rich vein of Hematite Ore has recently been discovered, and development work is in progress. In many other places there are indications of Iron. In the mountains there is Gold in Quartz ledges, and Galena. There are Coal outcroppings in various localities; Copper is found, and Potters' Clay and Ochres. There is an abundance of Brick Clay also. Good Building Stone abounds in most parts of the county. Wilhoit and Soda Springs are famous producers of mineral waters having rare medical properties, and much visited by health-seekers and tourists in summer time.

Nearly or quite half the area of Clackamas County still belongs to the public domain. Of course, the choicest land has already been taken—some of it many years—for this is a historic locality; but by going back a few miles from the river, or following the streams into the foot-hills, many choice locations may be found where farming and stock raising may be engaged in with profit, and comfortable homes made. Many of the old settlers have farms of several hundred acres each; and with the growing disposition to divide up these large tracts into smaller farms, a large amount of such land is now and must continue to come into the market.

No county in the Northwest is better supplied with transportation facilities than is Clackamas. The main line of the Southern Pacific Railway passes down the east side of the river. The Southern Pacific's Narrow Gauge road crosses the western part of the county. The Willamette River is another transportation route, and it is not only a very important carrier, but it operates to keep down the charges of the railways. Boats ply on the Willamette throughout the year. They pass the falls by means of locks. By its steamers on the river the Oregon Pacific Railway to Yaquina Bay is made a competitor in the carrying of Clackamas County products. There is a practical certainty of at least one motor line from Portland to Oregon City before the end of 1892. Projects are also on foot for building narrow-gauge railways from Oregon City to penetrate the remote parts of the county.

Oregon City is the seat of justice of Clackamas County, and it is one of the most important towns of the State. It is situated at the Falls of the Willamette River, probably the largest water-power in the world available at present. It is a town of five thousand population, having good schools, churches and theaters, graded streets, water works, etc. It is the seat of some

of the largest manufacturing institutions in the Northwest, among which are two extensive paper and pulp mill plants, two large flouring mills, a woolen mill, and the electric Plant that lights the city of Portland, twelve miles distant. About three million dollars are employed in these industries. The paper and pulp mills send their products all over the Pacific Slope, and are constantly adding to their facilities in order to keep pace with the demand for their output. The flouring mills send chiefly to China. The products of the woolen mill go largely to the East, where they hold their own in competition with the goods from the old manufacturing centers. An excelsior and shoddy mill, the only one in the Northwest, also does a large business. A soap factory, a cannery, a furniture factory, a sash and door factory, a wooden pump factory, a planing mill, a box factory, two sawmills, cement works, iron works, and a brewery, are among the other manufacturing establishments of the town. It has two newspapers—the *Enterprise* and the *Courier*. No town in the State has a more picturesque location than Oregon City. The residence part of the city is on a bluff, and the terraces ascend back to considerable altitudes, though all parts are conveniently accessible from the business center. The perpetually snow-clad peaks of the Cascade Mountains are in full view, and the winding river, with its wooded banks, makes a scene of rare beauty. Rocky cliffs, and grassy valleys, and tangled glades, succeed each other in an endless variety in the landscape unfolded from the elevation in and about Oregon City. The great cataract itself is a feature of perennial interest. Oregon City is a suburb of Portland in many respects. There is a rapid and frequent communication between them, and the country is fast settling up compactly. Thus Oregon City reaps an advantage from its proximity to the metropolis, while it has independent strength in being the county seat, and in its superior manufacturing advantages.

At Oregon City the Willamette River pours over a basalt ledge and falls a vertical distance of forty feet. In judging of the relative values of different water powers a comparison of figures showing the capacity of the largest ones in the East and West will be useful. The figures here given are the computation of the average power for the year, not merely at the lowest stage of water:

Name of place.	*Horse power.*
Holyoke, Massachusetts	12,260
Lawrence, Massachusetts	10,999
Lowell, Massachusetts	11,845
Manchester, New Hampshire	12,000
Minneapolis, Minnesota	52,000
Average for twelve months	99,104
Oregon City at low water	100,000

At Great Falls, Montana, there is a developed horse power of thirty-two thousand eight hundred and sixty-seven. The proposed development of Niagara Falls water power by means of a tunnel to cost more than three million dollars will realize only one hundred and twenty thousand horse power, considerably less than the average for the year at Oregon City, and no

fabulous expenditure is required to develop this power. Another important fact not to be overlooked in considering the relative advantages of the great water powers of the country, is the nearness of Oregon City to the ocean, and the means of cheap transportation thus brought to the door of the manufacturer. Tide water ascends the Willamette River to the Falls. Ocean vessels from all parts of the world now ply to Portland, which is only twelve miles distant from Oregon City, and at comparatively small cost a channel could be provided that would enable ships to ascend the river to that point. Of course, the facilities for shipping to foreign countries would not amount to anything if Oregon City be considered merely as a local manufacturing town; but its situation gives it more than local importance. It may receive from foreign lands those products which can be manufactured to advantage here, and ship its manufactures direct to foreign markets without intervention of expensive and annoying intermediate shipping agencies. It will naturally draw the raw products from a wide area of country to be manufactured where the most available facilities for working and shipping are.

There are a number of enterprising and promising towns in Clackamas County; Oswego, the seat of the greatest iron-manufacturing plant west of the Rockies, is one of these; Milwaukie, Clackamas, New Era, Canby, and Barlow are among these. A considerable volume of business is handled in each of these places, and the development of the county is likely to push them into prominence as trading centers.

Clatsop County.

The Astoria Chamber of Commerce furnishes the following reliable report of Clatsop County:—

This county is about thirty miles square, and lies in the northwest corner of the State of Oregon. It is bounded on the west by the Pacific Ocean, and on the north by the Columbia River, and across the southeast corner runs the Nehalem River on its way to the ocean near the boundary line of Clatsop and Tillamook Counties.

The county is cut up by navigable bays and rivers, which afford access to almost every part of it. The surface of the county is hilly, and near the center rises a prominent mountain that terminates in three lofty peaks, and is known as Saddle Mountain. From this mountain and its immediate vicinity the water-courses of Clatsop County radiate, emptying into the Pacific Ocean, the Columbia and Nehalem Rivers. The largest of these is tributary to the Columbia, viz., Young's River, with its Claskanine branches, and the Lewis and Clark River, the last made historically famous by Captains Lewis and Clark, the explorers who, with their party, wintered in 1805–6 on its west bank, two miles from its mouth, at Fort Clatsop. The third in size, the Necanicum, flows directly into the ocean near the south end of Clatsop Plains, and about fifteen miles south of the Columbia.

The face of the county is covered with dense forests of valuable Fir, Spruce, Cedar, and Hemlock, except the bottom and tide lands along the Columbia and its tributaries, and the famous Clatsop Plains extending along

the seashore, a distance of about twenty miles, with an average width of about two miles. The soil of Clatsop Plains is a sandy loam, producing Grass, Oats, Fruits, and Vegetables. The principal root crops cultivated for stock are the Rutabaga, Carrot, and Beet, of which as high as thirty tons to the acre have been grown.

Clatsop is essentially a grass-growing country, and the soil is particularly adapted to the growth of those vegetables which require cool, moist weather; hence peculiarly fitting for dairying. Several large dairies and one creamery are already in successful operation on Clatsop Plains. Several other dairies are maintained in other localities, but these sell the milk, supplying principally the city of Astoria. The cool summers and nutritious grass afford great advantage for making butter and cheese. Berries and fruit are successfully grown on Clatsop Plains, and by the farmers throughout the county.

Here are found the noted sea-side summer resorts, where thousands of people from the interior annually assemble during the heated term to enjoy the invigorating sea breezes and the delightful surf bathing. Between the plains and upland are peat marshes upon which the Wild Cranberry flourishes. The creek bottoms and tide lands are composed of the richest soils, the principal productions being, as yet, Grass and Root Crops. Not infrequently two crops of Clover and Timothy in one year have been grown and harvested on these lands, the Timothy yielding per annum (two crops) five to seven tons per acre. The uplands facing north are clayey; toward the south, clay mixed with sand. Both are fertile, and as soon as cleared of timber produce an abundance of grass, which is green and growing the year round.

The greater portion of the timber in this county is Fir, elsewhere known as the Oregon Pine, and of a good merchantable character. Spruce is also found here in large quantities, a valuable timber for lumber. Maple is plentiful in the Nehalem Valley, the knurls of "Birdeye" being valuable for veneering. Hemlock, Cedar, and Larch also abound. A person taking a timber claim can log it over or sell the timber standing, and as fast as the timber is removed burn off the brush, seed down and stock the land, thus in a short time clearing a farm out of a forest. Saw logs are always in demand. At this time they are worth six dollars per thousand. There are three sawmills in successful operation in Astoria, having an aggregate capacity of 150,000 feet per day. Manufactured lumber is shipped from here by river and rail East, and by sea to California, Mexico, South Ameria, and other foreign ports. On some of the tide land is Balm of Gilead and Tide Land Spruce, from which stave bolts and paper pulp are made. Firewood is worth two dollars per cord on the bank ready for the scow. Charcoal is extensively used in the canneries, and is worth ten cents per bushel. There is one tan yard in Astoria, which pays from six to eight dollars a cord for tanbark. Coal has been found in several places in this county. It is of fair quality, but as yet no attempt has been made to mine it.

Game is plentiful, consisting of Bear, Elk, Deer, Beaver, Mink, and Waterfowl; Trout in the small streams, and Salmon, Sturgeon, Tom-cod, and Smelt, in the Columbia. Deep-sea fishing vessels go out every few days and supply the markets of Astoria and Portland with Halibut, Rock-cod, Flounder, Soles,

Crabs, and other fish, from the fishing banks at sea, but a few miles distant.

Salmon fishing, lumbering, cattle and dairy business form the chief pursuits. Fruit is also receiving considerable attention. The salmon industry on the Columbia River is probably fully developed, and by judicious management the business will be perpetual. There are now employed over three thousand fishermen, with more than fifteen hundred boats and the same number of nets. About and in the canneries are employed about two thousand persons. Over one million dollars is invested in this business, and some of the firms are extending their business by establishing fisheries in Alaska. The annual catch of salmon in the Columbia River is about two and a half million dollars. The following table shows the size and value of the Salmon catch for the last twenty-five years:

Year.	Pack.	Value.
1866	4,000	$ 64,000
1867	18,000	288,000
1868	28,000	392,000
1869	100,000	1,350,000
1870	150,000	1,800,000
1871	200,000	2,100,000
1872	250,000	2,325,000
1873	250,000	2,250,000
1874	350,000	2,625,000
1875	375,000	2,250,000
1876	450,000	2,475,000
1877	460,000	2,490,000
1878	460,000	2,300,000
1879	480,000	2,640,000
1880	530,000	2,650,000
1881	551,000	2,475,000
1882	541,300	2,600,000
1883	629,400	3,147,000
1884	620,000	2,945,000
1885	553,800	2,500,000
1886	448,500	2,135,000
1887	356,000	2,124,000
1888	366,070	2,198,000
1889	313,064	2,035,000
1890	436,600	2,619,600
Total	8,919,734	$52,778,000

Total shipment of salmon for 1891, 12,238 tons.

The fishermen who find their own boats and nets, receive this year (1892) one dollar for each salmon.

The area of Government land in Clatsop County is rapidly diminishing. Nearly every quarter section of surveyed land is already in private ownership, and large sections of unsurveyed land are occupied by squatters, who will acquire title as soon as the land is surveyed. There is an abundance for all who work, and health, wealth, and independence for the frugal and industrious. Any part of Oregon is good to live in, but no part of the State offers more inducements to the home-seeker than Clatsop County.

The climate of the county is remarkably good. The Japan current, which comes near the Northwestern Oregon shore, equalizes the temperature of the year. The thermometer averages about 60° in the summer, and in the winter 44°. Abundant rain falls from November to May, and the hills and fields are

green the year round. Snow sometimes falls in January and February, but seldom remains more than forty-eight hours. The average annual rainfall for seven years is sixty-six inches. The people are cosmopolitan in character. They come mostly from Northern Europe and the older settled States in the Union; and in point of intelligence and energy, are fully equal if not superior to any community in the United States. The population of this county is about 16,000.

On account of logging, lumbering, and fishing being the chief industries, and the country not being an open one, or a grain-growing region, the majority of persons seeking employment have been seamen, fishermen, and loggers, consequently the farming interests have not been proportionately developed. The owners of logging camps would import or purchase rather than raise produce for their own consumption, necessitating the importation of vegetables, butter, eggs, bacon, hams, etc., from California and the interior counties of our State. Industrious farmers with from five hundred to three thousand dollars can here, in a short time, own a good farm, become independent, and live easily.

The climate is healthful, no epidemic or prevalent diseases being known. It is mild, the thermometer seldom falls below 20° above zero, and then for but a few days. Some winters there is no ice at all, and no snow of any consequence. Rain is abundant in winter, and occasional in summer.

There are sixteen church buildings in Clatsop County, besides other buildings temporarily used for places of religious worship. There are thirty-one public schools and fifty-two teachers, besides private schools.

The Union Pacific has through connections with their Eastern points by rail and river to Astoria. The Northern Pacific with its road from Portland to Seattle, comes down the south bank of the Columbia to Goble, fifty-eight miles from Astoria, to which place a railroad is now projected, the survey made, the right of way secured, and all made ready for letting the contract for construction. The Astoria & Portland Railroad is now being built as rapidly as men and money can do it, by way of the Lewis and Clarke and Nehalem Rivers, to transcontinental connection. The Astoria & South Coast Railroad is completed to Seaside, a distance of twenty miles.

Astoria, the county seat and the principal city, was founded by John Jacob Astor in 1811, on a peninsula embraced by the Columbia, Young's Bay and River, and the John Day River, and is about eight miles from the ocean, from which is a broad and safe entrance to the bay, with thirty-six feet of water on the bar at high tide; so that with a fair wind the largest ships can safely sail into anchorage in front of the city, as is frequently done. The city has a water frontage of five and one-half miles, where deep sea-going vessels of two thousand tons and upwards can lay at various wharves, or come to anchor in the stream. Astoria has a total water frontage of more than fifteen miles that may be utilized, affording unequaled facilities for commerce, manufacturing, and ship building. The commercial advantages of this place will be understood and appreciated from the following indisputable facts: It is situated on one of the largest fresh water harbors in the world—unvexed by storms, untroubled by that salt water pest, the teredo. The entrance to this deep and spacious harbor

is as safe as that of the well known Puget Sound. This has been demonstrated by the fact of a less number of marine disasters in proportion to tonnage as compared with the Sound and shown by the records of shipping as kept for the last decade. The commerce of Astoria is considerable. Three hundred foreign vessels and innumerable domestic steamers and coasters annually arrive at and depart from Astoria, which is the only real seaport Oregon has. Total vessels entered in 1891, 496, with total tonnage of 431,301 tons; total outward bound, 485 vessels, with total tonnage of 414,108 tons; total entered and cleared, 981 vessels, with total tonnage of 844.376 tons. Amount of freight received at Astoria by home merchants and dealers, 19,459 tons. Amount of literage up and down the Columbia, above Astoria, in 1891, 30,757 tons. Lumber shipped, 1891, 15,840,000 feet of fir. Nine lines of steamboats owned in Astoria ply daily to ports on the rivers and bays in the vicinity. Two lines of bar tugs, practically owned in Astoria, have their headquarters here. Numerous other steamboats are owned in and operated from Astoria, carrying freight to and from Portland and various other points on the river. Four lines of daily steamers ply between Astoria and Portland, a distance of one hundred miles. In the summer time, to meet the requirements of increased passenger traffic, several additional steamers are put on this route. The large ocean steamers belonging to the Union Pacific Company plying between San Francisco and Astoria, arrive and depart every four days during the year. There are also three lines of steamers making semi-monthly trips to Alaska; also regular lines to China, to Coos Bay, Tillamook Bay, Gray's Harbor, and Shoalwater Bay.

Astoria has a population of about ten thousand, with four graded schools employing twenty-three teachers. The schools rank with the best. There are eleven churches with a large number of communicants. The various secret, fraternal, and benevolent societies are well represented. Astoria has one of the most efficient volunteer fire departments to be found in the West. Here is the customs port for the District of Oregon. The Government has erected a substantial stone structure for the use of the customs and postoffice officials. The city has free postal delivery, over two miles of electric street railway, also more than two miles of steam motor line, the streets well lighted by electricity; water works furnishing an abundant supply of pure water, brought from a mountain stream fourteen miles away. Although the population is cosmopolitan, the society is good, and Astoria is noted for its hospitality.

Astoria is the center of business, not only for Clatsop County, but of a large district on the north side of the Columbia. It affords a good market for produce raised in the country. That the supply from this source is not equal to the demand, is evidenced by the fact that many tons of Hay, besides Vegetables, Fruit, and other productions are imported yearly from the Willamette Valley and California, which could and should be produced in Clatsop County. Astoria consumes five thousand sheep and two thousand five hundred beeves annually, and other meats and provisions in proportion. Practical and experienced gardeners and small-fruit raisers are needed to start vegetable gardens and fruit orchards near by. There is also needed at Astoria, a hemlock tannin extract factory, a flour mill, a furniture factory, several more sawmills, and

other factories. There is every needed facility at hand for a dry dock and for ship building.

A. R. CYRUS,
J. H. D. GRAY,
J. Q. A. BOWLBY,
Committee.

Approved May 16, 1892.
Attest: E. C. HOLDEN, Secretary.

COLUMBIA COUNTY

Is bounded on the north and east by the Columbia River, south by Multnomah and Washington Counties, and west by Clatsop. It contains 723 square miles, or 462,720 acres. The river washes the shores of the county for sixty miles, and, together with its many sloughs and inlets, affords transportation facilities that are unrivalled. Numerous steamboats ply the waters of the river and tributaries, and touch almost anywhere along the bank when hailed. The Northern Pacific Railroad passes through the county to a point on the Columbia River opposite Kalama on the Washington side, a distance of about thirty miles.

The county is divided by the Columbia River range of hills into two sections. That drained by the Columbia and tributaries, and the Nehalem Valley, comprising land in the basin of the latter stream. The summit of the range is about ten miles back at the southeast boundary of the county, but approaches within two miles of the river at the west boundary.

The land immediately bordering the Columbia is generally alluvial, built up by the sediment left by the annual June overflow of the river, which covers the lower portions almost every year, and all the river bottoms occasionally. While this is a serious drawback to farming, the deposit of sediment is a perpetual guarantee against "wearing out"; and good crops of Grass, Potatoes, and roots are raised after the overflow, and, most years, anything may be raised on the higher lands. Back in the "bottoms," and extending to the summit before mentioned, is the timber belt tributary to the Columbia. This section is generally hilly, interspersed with valleys, some of the former rising to the magnitude of mountains, the highest elevation noted being one thousand four hundred feet; the latter are of unsurpassed richness.

The resources of this section constitute a source of incalculable wealth. It is covered with a dense growth of Yellow Fir (Oregon Pine), of which it is not unusual to cut from 80,000 to 100,000 feet of saw logs from one acre, and from 6,000,000 to 12,000,000 feet from a quarter section. This timber is wasted in a manner painful to the eye of an Eastern lumberman. The trees are generally felled from a "spring board," and from six to twelve feet from the ground, and the tops from the diameter of two and often three feet left on the ground, as "not paying to haul." The standing timber is generally sold to the logger at from fifty cents to one dollar and twenty-five cents per thousand feet of logs hauled and put in the booms, the price varying with the facilities for getting the logs to the water and mills. The immense size of the logs, sometimes six feet in diameter, and, if of less diameter, often from fifty to sixty feet long, the long distance hauled, with oxen, from one to two miles, and the magnitude of the

operations giving employment to hundreds of men in building and keeping in repair the fine roads necessary, in preparing and hauling the logs, in rafting, floating, or towing to the mill booms, and in sawing the same into lumber render the markets of this county among the best in the world for farm prod, uce of all kinds.

There are large and excellent deposits of Iron ore in this section. Investigation has shown that there exists not only great quantities of float Iron ore, but a solid deposit or ore bed underlies the whole region eight or nine feet in thickness, and is enclosed with sandstone cap and bottom rocks. A similar bed of marine deposits, or shell Lime, four feet thick underlies the Iron ore, and about one hundred feet below the ore bed is a vein of Coal, eight or nine feet thick. Thus, within one hundred feet from the surface, exist Iron, Lime, and Coal, constituents of great value in the manufacture of Iron. Coal of fair quality can now be mined near Columbia City, and as the mountain rises behind the town, the deposit can be followed in and mined on a level instead of sinking shafts. The quality of the Coal improves as the bed is developed, and the thickness of the deposit increases.

The soil of this region is clayey loam, well adapted to the growth of clovers and grasses, and when cleared of timber and sown to grass, furnishes excellent pasture. The land is not more difficult to clear for cultivation than was the greater portion of the New England or Middle States, and being more prolific than the soil of those States, the results to be obtained from that labor would be more generous and satisfactory.

The portion included in Columbia County, known as the Nehalem Basin, has an area of about two hundred and fifty square miles, or about one-third of the entire county. The elevation of the river and its distance from the summit of the divide being greater than that of the Columbia, the surface is not generally so abrupt as on the Columbia slope, the hills falling rather in benches, some of considerable extent. Along the river and tributaries, the land, like that along the Columbia, is of alluvial formation and unsurpassed in richness. While putting in a dam, one of the settlers found the soil of the same quality for twenty-five feet in depth. Having been made by the deposit of the river, these "bottoms" are, of course, subject to overflow; but, with the exception of the lowest spots, only at intervals of several years, and then only for a few hours. There is deposit enough left to keep up the land, and, occurring in the winter, generally during the first part of January, no damage is done to growing crops.

The soil of these "bottoms" contains more clay than that of those on the Columbia, and, with proper treatment, is more productive. They are limited, however, to a strip from one hundred yards to half a mile wide along the river and its numerous tributaries, and upon this class of land and the swails scattered through the hills the present settlers are located; but few, as yet, being located on the fir lands. All these "bottoms" were originally covered with a dense growth of Yellow, Red and White Fir, Cedar, Maple, Alder, Ash and Balm trees, with a thick undergrowth of Vine Maple, Hazel, Salmon Berry, and Crab Apple. This thicket must be cleared off, which is generally done by cutting in June, running the fire through in August, burning the larger pieces

in piles and sowing to grain or grass in the ashes. The wheat crop will yield from twenty to thirty bushels, and the grass is pastured until the small stumps rot out.

The hill lands of this section are of much better quality of soil than those on the Columbia, and their slope being southerly still further enhances their value. The timber is generally fir, as on the Columbia, with this difference, the trees are smaller and taller and the timber harder. This timber, although not possessing the finishing qualities of its Columbia River rival, is fast coming into demand for export to the eastern market, for railroad ties, bridge timbers and ship building. It is both stronger and more durable. This forest is practically untouched by the logger, although fire has made some serious inroads. The timber of other kinds is scarcely worth mentioning, as the cedar is nearly all burned, the maple and ash will soon be all destroyed by the settler in his clearing operations, and the hemlock is valueless at the present time.

No Iron deposits have been found upon this side of the divide, although indications have been noticed. The coal bed, however, underlies the entire valley; indications are found in almost every stream and cañon, and the vein before mentioned has an exposed face of nine feet in height.

The largest tributary of the Columbia in this county and the one draining the largest and richest scope of country on this slope is the Clatskanie. It rises about six miles from the eastern boundary, runs in a general northwesterly course, and empties into the Columbia about six miles from the northwest corner of the county. A strip of land along the lower part of its course and extending along the bank of a slough to the west county boundary is believed by men, representatives of all nations, who have had a knowledge of it, to be one of the richest tracts in the world.

The chief industries of the county are sawmilling, logging, stock raising, dairying, and fishing. Sawmills are located at St. Helens, Rainier, Westport (just over the west boundary in Clatsop County), and several mills on the Clatskanie. They vary in capacity from 10,000 to 50,000 feet per day. Dairying is confined chiefly to Sauvies Island and the Columbia River bottoms, a limited amount being done on the Nehalem. Logging camps are everywhere on the Columbia slope. The stock raiser follows the logger, sowing grass seed in the old loggeries after the fire has swept over them. This industry is the principal one in the Nehalem section. Fishing is followed by many living along the Columbia; some having traps erected opposite their own shores and others using the gill net. The fish caught, Salmon and Sturgeon, are sent to Portland or the canneries below.

The climate and soil of this part of the country and of Columbia County are particularly adapted to the raising of fruit. Apples, Prunes, Pears, Plums, Apricots, Cherries, Quince, and all the small fruits, grow to a splendid development, and are finely flavored.

The principal towns are St. Helens, the county seat, Rainier, Columbia City, and Clatskanie.

The value of all the property in this county for 1891, as returned for the purposes of taxation, was $1,601,521.

Coos County.

By Southern Oregon State Board of Agriculture.

Coos County is bounded on the north and east by Douglas, on the south by Curry, and on the west by the Pacific Ocean, having a coast line of about fifty miles, and an area of 800,000 acres. The surface of the county is broken and hilly, the whole being completely environed by formidable mountain ranges. the Umpqua Mountains on the north and the Rogue River Mountains on the south run down to the ocean beach, forming a complete semicircle, the only pass being the Coos Bay wagon road, that crosses the lowest divide in the Coast Range from Douglas County. By reason of the heavy grades, this route has never become a profitable highway for commercial intercourse with the interior counties, leaving this otherwise highly favored section completely isolated from the active marts of trade in other parts of the State.

Coos Bay, in the northern part of the county, is a large body of water with large branches extending inward, and affording easy communication with the various towns that have sprung up along the irregular coast of the bay Coos Bay is the best harbor on the Oregon coast below the Columbia, but has the same objection to overcome that is common to Pacific Coast ports; sunken rocks and reefs have been disastrous to the general shipping interests in earlier years; but the General Government has already made appropriations which have been expended in building jetties that have made the harbor comparatively safe, and it is only a matter of time when the commercial demands of this thriving and prosperous section will direct attention to this important public work. There is much valuable agricultural and fruit land bordering the streams tributary to the bay, which is susceptible of the most profitable cultivation, the rich alluvial soil being especially adapted to horticulture and pomology. There is also a vast extent of tide land along the bay that is easily reclaimable by diking and draining, when the increase of population shall warrant the required expenditure. There is much fine timber along the bay that has already been utilized for ship-building and all other mechanical and cabinet work.

This part of the county is already well populated, and comfortable homes and prosperous towns indicate the enterprise and industry of the people, but the thousands of acres that are yet untilled and reclaimable from the dense forests and overflowed lands still invite the brain and brawn of additional numbers, to the unbounded health and wealth of this county. The Coquille River, in the southern part, and draining by its tributaries perhaps two-thirds of the county, is a stream of sufficient volume to be navigable a distance of forty miles from its mouth. This stream flows through a heavily-timbered country, and forests of Fir, Red and White Cedar, Ash, Myrtle, and Maple of symmetrical and luxuriant growth are used for furniture and finishing lumber, the Myrtle especially being capable of such high polish as to render it valuable for veneering. A bar at the mouth of this river has hitherto kept it from being a safe port of entry for heavy sea-going vessels, but the building of a jetty a few years since has deepened and improved the channel so materially that it is

believed, by extending the jetties, this can be made in time a safe port of entry for the commerce of the sea. Cattle and sheep raising are extensively engaged in in this county, the fine grazing on the uplands affording unlimited stock range. Sheep culture is more safely engaged in in the coast counties than in the open sections of the State.

The foothills along the mountain ranges are, by reason of their background of mountains, protected from the varying temperature of earlier springtime, and the ocean vapors more nearly neutralize the extremes of heat and cold, making the coast counties very desirable for the sheep grower and dairyman. Butter and cheese of the finest quality are manufactured, and find ready sale in the San Francisco market. Wool of fine growth and even texture is one of the staple commodities, but neither of these industries has approximated to its possibilities. With the enlarged advantages to be given them by the competition of interior trade, it may be assumed that these industries will be fostered and extended to keep pace with the general improvement and development of the country. Beach and placer gold mining has added a profitable revenue to the finances of the county. Extensive Coal fields abound—the Newport Coal Company having a line of Coal steamers carrying 750 and 900 tons at a load, running regularly from Marshfield to San Francisco. These vessels average about twenty cargoes a month. Bituminous Coal and Anthracite in limited quantity are indicated by their surface croppings on every hand. There are four Salmon canneries in operation in this county, and upwards of 20,000 cases are packed annually for the export trade.

The greatest drawback to the progress and prosperity of this county has been the great necessity of good wagon roads. Only those points that could be easily reached by the waterways of this section have in any way been given a test of their future possibilities. The last Legislature appropriated $15,000 to aid in the construction of a wagon road from Douglas down the middle fork of the Coquille River to tide water. This is but the beginning of a network of roads in this county to make inland communication between the towns possible.

The building of a railroad from some point in Douglas County on the line of the Southern Pacific Railroad across Coos County to the sea is now inviting the earnest consideration of home and foreign capitalists, and it is believed the time is not far distant when there will be a coast line of railroad from Astoria to San Francisco, "a consummation devoutly to be wished." Empire City is the county seat, a town of about 400 population. It has a good public school, an Episcopal Church, several good business houses, one of the largest steam sawmills in the county, and several Coal mines in the vicinity. The trade is good, being with a thrifty surrounding country. Lumber, Coal, and Fish are shipped.

Marshfield is the principal town in the county. Most of the local trade centers here, and it is well located on deep water on the west side of the bay at the mouth of Isthmus Slough. The place does a thriving business, having a population of about 2,500. It contains some fine business stores, many of them being brick. It contains Baptist, Catholic, Methodist, Episcopal, and Presbyterian Churches, an excellent public school with four teachers; sash,

door, and furniture factory; three sawmills, tannery, box and barrel factory; brewery, bank, and three newspapers—the *Coast Mail*, *Sun*, and *Coos Bay News*. It has city water works, and an efficient fire department; has excellent hotel accommodations, and is lighted by electricity. From Bay City, opposite Marshfield, to North Bend, a distance of about four miles, are located the principal mills and manufacturing plants in operation. From Marshfield up Isthmus Slough, twelve miles, is Utter City, a small town; and eleven miles south from this point is the Coquille River. This stream is navigable about thirty-three miles from its mouth. It has a wide and extremely fertile valley, and supports quite a population, with Bandon, Randolph, Parkerburg, Coquille, Norway, Arago, Myrtle Point, and Angora, as towns or postoffices.

From Coquille City a steamboat makes trips to and from Bandon daily, and one runs also to Myrtle Point, the head of navigation. Coquille City has a population of about 1,000, two or three good hotels, and does a thriving business. Contains a flouring mill, a sawmill, a bank, bottling works, weekly newspaper (the *Herald*), water works, lodges of Masons, Odd Fellows, a G. A. R. Post, three churches, an excellent academy, and a good public school. Ships Lumber, Wool, Hides, Shingles, etc. Ten thousand tons of Coal are mined annually in this vicinity.

Myrtle Point is a thriving town, and has a population of about 750. It is in the midst of a good agricultural, lumbering and mining district. There are saw and flouring mills, new brick buildings of the value of $27,000, including a fine public school, a business block and Presbyterian Church. Other denominations are also represented by the German Baptist, Methodist, and United Brethren. It supports a weekly newspaper (the *West Oregonian*), and an academy. Gold mines with an output of $20,000 annually are worked. Coal beds are being developed.

The value of all property in this county, as returned for the purposes of taxation in 1891, was $3,415,160.

CROOK COUNTY.

This county is bounded on the north by Wasco and Gilliam, on the east by Grant, on the south by Lake and Klamath, and on the west by the Cascade Mountains, and has an area of about eight thousand square miles. The western part of the county is hilly and mountainous, though valuable for grazing purposes; and much of this section may be used for agricultural purposes. The entire county is hilly, rolling and valley, all covered with bunch grass exceedingly rich and abundant, furnishing the best possible feed for stock of all kinds. Like other portions of Eastern Oregon, it was for a long time thought the land was unfit for farming purposes; but within the past few years it has been determined that the land is exceedingly fertile, since wherever tried it yields large crops of whatever is planted. The county is well watered by rivers and small streams, the principal of which are the Des Chutes and Crooked Rivers.

The principal business of the people is stock raising, which is immense. Agriculture has received but little attention as yet, on account of the absence

of transportation facilities. The projected Oregon Pacific Railroad will cross the county; and when that day comes this section will be rapidly settled by thrifty and accumulating farmers. All the hardier fruits grow well, ripen to perfection, and possess a superior flavor. Soil, climate and water favor the dairying industry, not now much engaged in,—in fact, only enough to supply the home demand.

There is an abundance of good land in this county yet belonging to the Government and used by stock men upon which to graze their flocks and herds. It is a great pity that so many industrious, economical, self-denying, but poor men who do not know what it is to own an acre of land, and who, probably, never will, if they remain where they now are, cannot settle in these open, unclaimed fields, and make themselves and their families independent, comfortable and happy homes. If thousands of these people in the older States of the Union but had the pluck, grit, nerve, and ambition that our pioneers of 1846 to 1850 had, it would not be long until the broad and fertile acres now used, for the taking, by the enterprising stock men, would in the harvest season be covered with waving golden grain.

Prineville is the county seat, and for an inland town is thriving to a large degree. It is the distributing point for a large country. It is located in the center of the county, at the junction of the Ochoco and Crooked Rivers. It contains a flour mill, sawmill, and a planing mill, propelled by water, a bank, a brewery, and the usual mercantile and other places of business, two weekly newspapers (the *Ochoco Review*, and *Prineville News*), Baptist and Methodist Churches, lodges of Odd Fellows, Masons, A. O. U. W., I. O. G. T., and an efficient Volunteer Fire Department. There is a good public school ten months in the year. The town has a population of seven hundred.

The value of all property returned for the purposes of taxation in 1891 was $2,277,490.

Curry County.

By Southern Oregon State Board of Agriculture.

J. A. Haines, Esq., member of the district board, contributes the following facts:—

Curry County is situated in the extreme southwestern part of the State; it is bounded on the north by Coos, on the east by Josephine, on the south by California, and on the west by the Pacific Ocean. It has a coast line of eighty miles, with an average width of thirty miles, and an area of 2,400 square miles, and a population of 1,500. The surface of the country is hilly, and, in the eastern part, mountainous. The mountains are heavily timbered with the finest growth of Fir, Cedar, Spruce, Hemlock, and Myrtle. Small streams of purest water flow in sinuous courses through the mountains, affording a vast extent of fine grazing land. The larger waterways are Sixes, Chetco, Elk, and Rogue Rivers. Chetco and Rogue Rivers are navigable for light-draught vessels. Ellensburg and Port Orford are the principal towns. Ellensburg is the county seat, and is situated at the mouth of Rogue River. Port Orford is situated on Port Orford Bay, and is the place selected by the United States Engineers as a harbor of refuge on the Oregon coast.

Although this is not an agricultural country, the very best diversified crops have been successfully matured, and stock raising and dairying are engaged in extensively and profitably.

The fine bottom lands lying along the rivers are very productive, and yield large crops of Hay, Oats, Barley, and potatoes; Wheat and Corn are successfully but as yet not extensively grown. Fruit culture is as yet in embryo; quite an acreage has been set in trees, however, and many fine young orchards have demonstrated the fact that all kinds of semi-tropical fruits can be grown to perfection. Stock raising and dairying are extensively engaged in, and there are now sixteen dairies in the county in successful operation, running from twenty-five to one hundred cows.

At Ellensburg a Salmon cannery packs annually 20,000 cases of Salmon during the fishing season. There are four sawmills in the county, one on Elk River, having a capacity of 24,000 feet per day.

The export products of the county are Sheep, Wool, Butter, Lumber, and Canned Salmon. Gold, Copper, and Coal mines are found in the county, but have not become a factor in statistical assets from lack of means to successfully develop them. The greatest drawback to the prosperity of this county so far has been the want of wagon roads. Home-seekers could not reach the county except by such circuitous routes as in the main to turn the tide of immigration from us. There is now in building a wagon road from Chetco to Port Orford that has $15,000 State aid to insure its completion.

The harbor of refuge at Port Orford, when completed, will afford a fine and safe harbor for the commerce of the sea, and will attract as a terminus the first line of railroad that crosses the southern part of the State. This healthful and beautiful part of the State is at once an asylum for the invalid, and a good opportunity for small or large investments. Small capital finds safe and speedy returns in those industries already established, and unlimited investments will bring satisfactory returns in the not far distant future, when Eastern railroad connection naturally tends to the coast. The time when safe and easy transit opens up the highways of commerce to us, and our valuable timber and grazing land, and our undeveloped mineral and horticultural resources are fully demonstrated, will mark not only for this section increased prosperity, but also for all the southern counties of the State. Here, in sight of the restless waters of the Pacific Ocean, has been held in generous reserve a matchless reach of gorgeous hill and plain, environed by sparkling waters and majestic mountains; here the poet and the artist can breathe the inspiration of nature's varied charms, and the wage-winner can wrest with easy hand his tribute from the soil.

Gold Beach, formerly Ellensburg, is the county seat, and is situated at the mouth of Rogue River. The river at this point is navigable for small steamers and schooners, which carry a traffic with San Francisco by sea. It is quite a flourishing town, and supports an excellent public school ten months in the year. There is a Catholic, United Brethren, and an Episcopal Church. A weekly newspaper (the *Gold Beach Gazette*), is published here.

The value of all property in this county returned in 1891, for the purposes of taxation, was $719,196.

Douglas County.

ITS POSITION, CLIMATE, SOIL, AND RESOURCES.

By W. F. Benjamin.

By reference to a map of the State it will appear that Douglas is one of the southwestern counties, bounded by Jackson and Josephine Counties on the south and Lane County on the north, and extends from the summit of the Cascade Mountains on the east to the Pacific Ocean on the west, resembling in form that of a mutton ham with the shank on the ocean. The area of Douglas is 4,900 square miles. The surface is a series of hills and valleys; the latter are of an alluvial deposit and very fertile, producing all the cereals and vegetables of this latitude in abundance and of the best quality. It is the natural home of all the staple fruits. Apples, Pears, Plums, Prunes, Peaches, Cherries, Quince, and Grapes grow to perfection and with comparative little expense, and the yield is enormous. The yield of a single tree when in full bearing is from three to seven bushels, while ten bushels to a tree is not uncommon for Apples, Pears, Plums, Peaches, and Prunes. All the small fruits grow to perfection and are becoming extensively grown. Corn, when properly cultivated, yields well and is quite remunerative, but does best on bottom lands. The uplands, or "bench lands" as the hillside lands are called, owing to the long, dry season, do not produce Corn profitably. Late experiments with the Sugar Beet prove that it can be profitably grown, as the yield per acre is immense and the quality excellent. The agricultural interests are changing from grain to fruit growing as being more remunerative. Stock raising is also largely engaged in, and improved stock of all classes is now the rule, and, as a consequence, an excellent grade of stock is attained. Douglas County stock of all classes has become proverbially good. Umpqua Valley Wool in the Boston market commands from two to four cents per pound more than any other Western Wools on account of the length, fineness, and strength of fiber. This is attributed to the equableness of our climate and the absence of alkaline properties of the soil.

WATER.

Douglas County is the best watered county in the State, the water being of the best quality. All the streams—which are numerous—flowing down from the mountains are of the purest kind, their rapid movements preventing stagnation, and hence malaria so common along sluggish streams is unknown. Innumerable springs issue from the sides of the hills the year round, thus making excellent pasturage for stock. The streams also furnish power for driving machinery and manufacturing purposes.

TIMBER, WOOD, AND LUMBER.

The sides of the mountains to their very summits are covered with forests of Pine, Fir, and Cedar, which make excellent lumber for building and fencing purposes. There are also of the hard woods, Oak, Ash, and Maple in large quantities, which make excellent furniture and fuel.

MINERALS.

In the mountains there is abundance of metals, and mining for gold is quite extensively carried on. Millions of dollars in gold have been taken from the mines on Hogam, Starveout, Tennessee Gulch, Cow Creek Cañon, Myrtle Creek, and Coffee Creek, all of which are still worked successfully. There are two cinnabar mines in successful operation, and a nickel mine on Cow Creek, near Riddle's Station, on the Southern Pacific Railroad, which bids fair to become a bonanza. Iron also abounds in several localities. Marble of excellent quality is abundant, and is receiving much attention. There is now being turned out some very fine specimens. Messrs. Woodward, Willis & Co. have erected a mill on South Deer Creek, and are turning out large quantities, superior to the Tennessee Marble, and far more beautiful. There are also vast beds of Coal underlying the entire area of this county. Several mineral springs of excellent medicinal properties are found.

AGRICULTURAL.

Until within a few years the farmers were chiefly engaged in grain growing and stock raising. The agricultural pursuits are now being more diversified, and fruit culture is receiving much attention. As a result large Prune, Peach, Pear, and Plum orchards are fast coming into bearing, which is far more remunerative, and the county is making a corresponding improvement generally.

MANUFACTORIES.

As is generally the case, all new counties labor under great disadvantages for the want of manufactories. These counties require time for settlement sufficient to create a remunerative demand for manufactured goods of general use. Douglas County has now acquired a population of about 15,000, and an urgent demand is now made for the manufacture of all the necessaries of life, the raw material for which is almost indigenous to the soil and climate. As a result we have several manufactories in operation, such as flour and lumber mills, planing mills, sash and door factories, marble mill, and tannery. We also have a fruit canning establishment in course of construction at the county seat, with a capacity of twenty tons per day. Other manufacturing enterprises are receiving favorable consideration, and we soon expect to see Douglas County take a high position in the manufacturing industries of the State. This county has great natural advantages in this line of substantial improvements, and cannot long allow them to go to waste.

EDUCATIONAL.

Douglas County has taken a deep interest in educational matters. Every neighborhood of fifteen or more children of school age is provided with a school, chiefly at the State's expense. The standard for teachers is high, and as a consequence they are well up in their profession and are doing a noble work. Our schools will favorably compare with those in more favored sections of the country. One of the four normal schools in this State is located at Drain, on the Southern Pacific Railroad, forty miles north of Roseburg. This

institution is fitting teachers for the work, and is turning out many first-class teachers.

CLIMATE.

The climate is proverbially excellent—the best, all things considered, on the Pacific Coast. It is not so wet and cold as the Willamette Valley and Washington, nor so dry and parched as California. It occupies a happy medium; and as fast as people become acquainted with these natural climatic advantages they become enthusiastic in its praise, and settle amongst us permanently. Society having become, as it were, crystalized into a refined state, is attracting the better class from the East to make their homes here, and aid us further in making Douglas County the first and foremost county in the State, where her salubrious and lovely climate may be enjoyed by a prosperous, law-abiding and happy people.

RAILROADS.

The Southern Pacific Railroad runs through the county from north to south, furnishing excellent facilities for communication with all the rest of the States. Another road from Coos Bay to Roseburg is in course of construction, and doubtless will be completed during the present year. This will greatly benefit the county, as it will give its producers and consumers increased advantages of trade and travel, and add materially to developing a large area of territory hitherto comparatively unsettled and unimproved. This road will doubtless also connect ultimately with some Eastern line, probably the Northwestern. When this road, the Coos Bay, Roseburg & Eastern Railway, is completed, it will give Douglas County an outlet to the sea, and be the means of building up a port and market at Marshfield, on Coos Bay, that in time will rival Portland as an entrepôt for trade with the Sandwich Islands, China, Australia, and all the coast cities of this continent, from Chili to Alaska, and all the Islands of the Pacific Ocean. The imagination of the most sanguine can scarcely conceive of its magnitude and importance in the not far distant future; and we may—it is not chimerical, but within the bounds of possibility and of a reasonable probability—look forward with fond anticipation to the time when this magnificent harbor on the coast immediately west of Douglas County shall become one of the best on the Pacific Coast for commercial use, and when there will be a magnificent city there teeming with thousands of business houses engaged in trade with all the world, in which Douglas County will naturally share its advantages and become one of the richest counties in the State. Douglas County has already been doubled.

THE ITALY OF AMERICA.

The mildness of our climate, the fertility of soil and the variety of its productions justly entitle it to this fitting and distinguishing appellation.

RAINFALL.

A very general idea has gone forth that the rainfall in Douglas is excessive, and interferes with locomotion to such an extent as to make it not only unpleasant, but damaging to business. This idea has caused Oregon to be

derisively called "Webfoot." By reference to the table of rainfall furnished by the Government observatory here it will be seen that the maximum at Roseburg for the last eleven years was 44.83 inches, and the minimum 22.40 inches, while the average for that time was 35.06 inches. By comparison with the Mississippi Valley States this average will be perceived to be nearly the same. When it is understood that plowing is chiefly done here during the rainy season, this idea of continuous rain in winter will be found to be erroneous.

THERMOMETRICAL.

The range of the mercury, as shown by the Observer at Roseburg, indicates a very even temperature. The highest ever attained was 102°, and the lowest 3.3°, Fahrenheit, while the average is 52.3°. Ninety degrees is usually the highest point attained, which lasts not more than two hours in the day, and that for only a few days. The nights are proverbially cool, and sleep is enjoyed as a luxury unknown to people of the Eastern States in the Summer months.

TOWNS AND VILLAGES.

Roseburg, on the east bank of the South Umpqua River, six miles above its junction with the North fork, is the county seat, contains 3,000 inhabitants, and is fast assuming the proud distinction of a city. It is incorporated, has an efficient city government, a first-class graded school, a school house that cost over $16,000, a $40,000 court house, one of the best water works in the State, enjoys a superb electric light plant, has a system of sewage commenced, and her citizens have taken hold of and are pressing forward other enterprises that will, when completed, place the city amongst the most prosperous and energetic in the State. Her citizens have faith in the future possibilities of the country, and with faith in themselves are pressing forward in the development of the county. Wilbur, Oakland, Yoncolla and Drain are thriving towns on the north; and on the south we have Myrtle Creek, Riddles, and Glendale. The above-named towns are on the line of the Southern Pecific Railroad. Besides these we have Looking Glass eight miles west, Elkton, Scottsburg and Gardiner on the main Umpqua River northwest twenty-five, sixty and eighty miles respectively, and Canyonville six miles east of Riddles. At all of these towns considerable business is done, besides enjoying the ordinary institutions of the thriving villages, such as stores, hotels, schools, churches, and secret order lodges, Masons, Odd Fellows, A. O. U. W., Granges, Farmers' Alliance, etc., with the usual parasites of civilization, saloons. But these are yearly sprayed with a solution of high license that keeps them from wholly sapping social life, or choking good order.

TAXES.

As is usual with all new counties there have been large expenditures for the construction of roads, bridges, school-houses, and necessary public buildings. To pay for these needed improvements while the population was small and the valuation of property low, a high per centum has been the rule, but that is all changing now. Population has largely increased, lands have become taxable, and the public buildings mostly paid for and the value of property enhanced

so that the per centum is growing less each year. The per centum of State levy is only about four mills on the dollar, with a downward tendency. The county levy has been as high as sixteen mills, but it has dropped to eleven mills, and soon we expect that seven mills or less will raise all the revenue needed. If property were valued at its actual cash value two mills would be sufficient for county, and one mill for State purposes.

GILLIAM COUNTY.

From a report prepared by the Executive Committee of the Board of Trade of the city of Arlington, the following statement of the resources of Gilliam county is obtained:

It is bounded on the north by the Columbia River, on the east by Morrow and Grant, on the south by Crook, and on the west by Wasco and Sherman.

LANDED AREA.

Estimated area of county in acres	1,000,000
Number of acres deeded land	129,806
Number of acres railroad land	14,764
Estimated number of acres held under the various acts of Congress, but not deeded	333,719
Total land held, deeded and undeeded	478,280
Estimated amount of Government land	621,240
The amount of Government land that would produce good grain nothing accurate can be given, but it is approximated at	373,000

TAXABLE PROPERTY.

Town lots	$ 100,000
Improvements	1,000,000
Merchandise and implements	612,827
Money, notes and accounts, and shares of bank stock	468,188
Horses and Mules	183,884
Cattle	122,631
Sheep	157,144
Population of county, near	6,284

INCORPORATED CITIES.

Arlington, population	816
Fossil	550
Condon	350

Arlington, the metropolis, is situated on the Columbia River, near the center of the county from east to west, and is one hundred and forty-one miles from Portland. It is an important shipping point for all produce of the county that finds a ready market in Portland, to which point it has excellent transportation facilities in the main line of the Union Pacific Railroad, besides water communication with the Northern Pacific Railroad at Pasco, which outlet gives us two transcontinental lines, and commercial intercourse with

not only Portland, but the cities of Seattle and Tacoma, and the metropolis of Eastern Washington, Spokane Falls.

Arlington has an excellent city government, water-works, and fire department. At a recent election it was voted to bond the city for $10,000, to improve the water works, and put in an electric-light plant. There are also communications with Klikitat County, Washington, by ferry, which brings a large trade to Arlington from the Washington side of the river. Most lines of business are represented here; still, there is room for more, and good business men with capital at their command can always find opportunities here for almost any legitimate enterprise, with assurance of reaping a fair profit. Arlington has a good free school, two churches, and a free reading-room for the benefit of those who would avail themselves of these privileges.

Fossil is situated in the southern portion of the county, and is noted for the excellent farming and grazing lands surrounding it, and the presence of Coal mines in close proximity, which, when developed, will prove a source of great wealth.

Condon, the county seat, is near the geographical center of the county. It is in the midst of a good farming district, and most lines of business are represented here.

The smaller towns are: Blalock, a prominent shipping point on the Columbia River, nine miles west of Arlington; Quinns, on the Columbia River, fifteen miles from Arlington and six miles from Blalock. These two towns are on the Union Pacific Railroad, and enjoy excellent shipping facilities. Olex, Legality, Shelby, Clem, Ajax, Idea, Matney, Mayville, Lone Rock, Crown Rock, Francisville, and Lost Valley, are distributing points for the United States mail, and good service is rendered by that important branch of the Government. Arlington has one weekly newspaper, the *Arlington Record;* Fossil one, the *Fossil Journal;* Condon one, the *Condon Globe.*

GRAIN.

Wheat is the principal source of wealth in exports, there being eight hundred thousand bushels raised in this county in 1891, bringing an average price of seventy-eight cents per bushel. It is generally conceded that this favored county can produce as much Wheat to the acre as any county on the Pacific Coast. The peculiar formation of the soil also renders farming a much lighter task here than in most grain-producing countries; and the long and favorable seasons for seeding and harvest enable the farmers to cultivate more land with the same number of men and teams than where the seasons are shorter, or the land more difficult to cultivate. The average yield of Wheat per acre for 1891 was twenty-five bushels; some farms produced over forty bushels to the acre. The reliable farmers here consider that money can be made raising Wheat at fifty cents per bushel, owing to the cheapness of production. Oats, Rye, and Barley yield fairly well.

WOOL.

Wool is another very important industry, there being 2,023,499 pounds shipped from the county during 1891, which brought an average price of twelve and one half cents per pound, bringing a revenue of $252,937.

The shipments of live stock during the year were:

Horses	62 carloads
Cattle	49 carloads
Sheep	15 carloads

Gilliam County lies about thirty miles east of the Cascade Mountains, on the Columbia River, and has a water front on that stream of thirty-one miles, which is nearly its average width from west to east. It extends in length from the river about seventy-four miles south, the southern boundary lying on the slope of the Blue Mountains.

Taking all things into consideration, this is undoubtedly to become one of the leading counties of the State in wealth and prosperity, in the near future. Immigrants would do well to study the resources of this rapidly growing county before making a permanent location on the coast, for, besides the thousands of acres of vacant Government land all ready to be homesteaded, deeded land sells now at an average price of six dollars per acre.

GRANT COUNTY

Is bounded on the north by Gilliam, Morrow, and Umatilla, on the east by Baker and Malheur, on the south by Harney and Crook, and on the west by Crook and Gilliam. The principal industries of its population are stock-raising and mining. The reason why it has not been settled more by an agricultural population is its isolation from navigable rivers or railroads, and a misapprehension by the people of the quantity and quality of its arable land. The construction of the Oregon Railway & Navigation Company's road through Baker County has greatly reduced the distance from the center of population in Grant County to a railroad outlet, and it will doubtless not be long before the Oregon Pacific will have its line completed through the county east and west. This road will cross the county about midway between its northern and southern boundary. For this reason, and because it contains a large portion of desirable vacant land unencumbered by railroad grants, the county offers inducements which should receive the careful consideration of immigrants. There is little land, except on the Lower John Day and its tributaries, that is less than three thousand feet above the sea level. Considering the altitude and elevation, one might expect a climate of great severity, but such is not the case. The mercury falls sometimes quite low, but these cold snaps are infrequent and of short duration. Among the mountains, of course, the climate is subject to sudden changes. Snow seldom falls to any great depth, except in the mountains, and seldom remains on the ground more than a few days below the timber line. Rain seldom falls from June to September, except in sudden thunder showers that sometimes occur with great fury. Although the summers are warm, the heat is not uncomfortable, owing to the dryness and purity of the atmosphere. The nights are always, or nearly always, cool.

The agricultural possibilities of this region have never been fully recognized. The farming lands consist chiefly of narrow valleys and adjacent foothills. The small farm, producing diversified crops of grain, hay, and vegetables,

and in giving support to a limited number of Cattle, Sheep, Horses and Swine, can be made to yield a splendid living for thousands of energetic families.

The soil and climate of Grant County are adapted to the raising of all the hardier grains, fruits, and vegetables. Wheat, Oats, Barley, and Hay are the leading crops. The nights are too cool for Corn to do well, though Corn is raised in the warmer valleys. Apples, Pears, Plums, Cherries, and Berries of all kinds thrive, but Peaches cannot be depended upon; yet good Peaches are raised in certain portions of the county, where the topography favors them and gives them shelter from extreme cold.

Except in the southern portion, the county is well watered by numerous large and small streams and springs of pure water. The northern portion is well timbered, while the southern is nearly barren of trees. The leading varieties of timber are Pine, Fir, and Tamarack. A dozen sawmills are at work cutting lumber for the home market, which has to be hauled long distances, in many cases, before reaching the point where used. Increase of settlements will lead to an increase in the number of mills and the consequent facility for procuring cheap Lumber. Nothing but a detailed description of the county by its natural subdivisions can give an adequate idea of its agricultural possibilities. In proportion to its total area the amount of arable land is small, but when the numerous valleys are considered by themselves and their areas added together, the result carries the total far up into the millions of acres. Put together in one body, it would make a compact arable tract equal in size to some of the best counties in the State.

The most important stream is the John Day, rising in four great streams in the Blue Mountains, and after uniting, flowing easterly and northerly to the Columbia. Along this stream, its various forks and tributaries, are thousands of acres of fine arable land, much of which is still open to settlement. The main stream rises in the mountains to the northeast of Strawberry Peak and flows directly east till it is joined by the South Fork. Along it lies what is known as the John Day Valley—a tract of fertile bottom land 70 miles long, and varying from one to six miles in width. The general altitude of the valley is 3,600 feet. Along the South Fork, above its junction with the main stream, is a valley fifteen miles in length and from one to two in width. There are a large number of fine valleys further north, along the Middle Fork of the John Day and its tributaries. Fox Valley lies about fifteen miles north of Canyon City, and is a fertile tract about eight miles square. Long Creek Valley is about six by seven miles in area. Along the Middle Fork are several small valleys from three to five miles square, and separated from each other by narrow cañons. Whilst these are partially settled, there is plenty of room for new-comers. There is in this region a section about forty miles square, which is the warmest in the county. Haystack and Corncob Valleys, as well as numerous smaller ones, are situated in this warm tract, where many excellent locations may yet be found upon Government land. Melons, Strawberries, and fruits of all kinds grow here to perfection.

Another large stream flowing into Harney Valley is Silver Creek, west of Silvie's Creek. The valley along this stream is twenty-five miles long and ten wide, and is occupied mostly by stock firms. The same is the case with Warm

Spring Valley, a tract of eight by eighteen miles, lying just below Silver Valley.

Grant County is rich in minerals. It was the discovery of gold on the John Day that first led to its occupation.

The mining interests of Grant County are extensive, for full information concerning which the reader is referred to the chapter on Mines.

Canyon City is the county seat, located in nearly the center of the county about one hundred miles southeast of Heppner, and seventy-seven miles southwest of Baker City; population, about 600; is provided with a good public school, a newspaper, the *Grant County News;* Methodist, Catholic, and Episcopal Churches, a bank, sawmill and plaining-mill, sash and door factory, mercantile, and other houses, and does a thriving business. The trade is in Wool, Live Stock, Hides, Grain, and Fruit.

The total valuation of property in this county as returned for the purpose of taxation in 1891, was $1,775,314.

HARNEY COUNTY.

This county is bounded on the north by Grant, on the east by Malheur, on the south by California and Lake County, and on the west by Lake. It contains twelve thousand square miles, and is the largest county in the State. A spur of the Blue Mountains extends into the more northern part of the county, and bordering upon the slopes of these an abundant supply of timber is afforded for building and fencing purposes. South of the lands of this character begin a succession of numerous valleys, large and small, which, in the aggregate, are a vast body of the most desirable lands for settlement, extending into ranges of grazing land almost unlimited in extent and capacity to support herds of cattle, horses, and sheep, with a growth of natural pasturage unexcelled in Eastern Oregon. Harney Valley, the largest of these, is situated about centrally in the county. It is some thirty miles long and twenty wide, and is watered by the Silvies River. Magnificent meadow lands are to be found here, affording abundant grass the year round. Wheat, Oats, Rye, Barley, in fact all the productions in the most diversified farming, are easily and prolifically produced. The hardier fruits, and berries and vegetables grow in profusion. Agriculture has, however, advanced no farther than to supply the local demands, attention here, as so often noticed elsewhere, centering in stock, horses and wool production, in which this whole region excels. Happy, Diamond, Silvies, and Silver Creek Valleys are others lying in various directions, all awaiting settlement, with fine opportunities for the immigrant. No county in the State presents so vast a quantity of unoccupied land of greater fertility and with better climatic conditions. The summers are warm with cool nights, and the winters confined within the limits of some six weeks, with but moderate snowfall, and this generally of too transient a character to necessitate feeding.

It is not exaggeration to say that cattle do well the year round without other fodder than the ranges afford. The frequent allusion to stock here as being able to subsist through the winter without attention will not be received by the Eastern farmer or beef-raiser as being the proper method by any means. It does, however, convey to such some idea of the magnificent opportuniti s

here, and the great results which would attend the efforts and methods employed there in this pursuit. It argues strongly in favor of the fencing and cultivation of these ranges no less for the improvement of stock than for agricultural development. If the great natural ranges in Texas and New Mexico have not been able to supplant the successful stockmen of Illinois and Kentucky, how far short of competing with the improved breeder, in this region, will they fall when careful methods prevail and attention is bestowed? Not to be prepared to render necessary assistance during occasional periods of severe weather, is for the rancher to only partially profit from the great advantages here; and, it is but to throw away the splendid opportunities, to enter this profitable field with preconceived notions that prudent methods are unnecessary. It is the contemplation of what might be done here with a little care that recommends this region to the thrifty settler.

Except in the extreme southern portion, which is barren of trees, the county is well watered with lakes, rivers, streams, and springs. Here, although, far from communications now, small farms and homes can be located on the borders of these streams. Where thousands of families might be settled upon this land of great fertility, with plenty of wood about them and water abundant, the stock-raiser holds it in wasteful monopoly. The idea that this land is fit only for grazing is vanishing. The tide is setting in strongly this way, and an era of real prosperity is dawning on even these remote places. There are too many energetic, thrifty, intelligent men seeking homes for themselves and families to much longer permit the appropriation of these unowned lands for the benefit of the few.

The Oregon Pacific Railroad is projected to cross this county, and there are the best of reasons to believe that but a few years will intervene before this part of Oregon will be crossed by a railroad reaching from the Pacific Ocean to Chicago.

Burns is the county seat, situated fifty miles southwest of Ontario, on the Union Pacific, and has a population of 750. The United States Land-Office is located here, and the town contains a Methodist church, a flouring-mill, and a weekly newspaper—the *Harney Valley Item*. It has a large trade from an extensive farming and stock-raising country. There is a good public-school, a lodge of Masons, Odd Fellows, and a G. A. R. Post. It is a thriving, growing interior town.

The total value of all property of this county returned for the purpose of taxation in 1891, was $1,974,690.

JACKSON COUNTY.

By SOUTHERN OREGON STATE BOARD OF AGRICULTURE.

This county is bounded on the north by Douglas, on the east by Klamath, on the south by California, and on the west by Josephine. The general surface of the country embraces three divisions of land—that which is on the high mountain-tops, that on the hills or broken ridges, and that in the valleys. The first is utilized for summer range for stock, the green grass growing as the snow disappears, and affording rich pasturage for numerous herds, and is also

a most desirable place for butter and cheese-making. The hill land is the timber-bearing region and the home of the stockmen. The soil is capable of a high degree of cultivation, and as it is denuded of its timber, is usually planted in cereals and grasses. The valley land is composed of the successive alluvium deposits of different geological periods and the constant disintegrations for the surrounding mountains. The soil of Jackson County is more varied than that of any other in the State, and it is not unusual to find five or six different kinds on a farm of one hundred and sixty acres.

The Rogue River Valley occupies the central portion of Jackson County, and is about thirty-five miles long by twenty miles wide. It takes its name from the river which flows through its northern extremes, though Bear Creek drains the greater portion of the Rogue River Valley proper. Little Butte Creek and Sam's Creek form considerable additions to the main valley by their contiguous territory. All of these streams empty into the main river within a few miles of each other. Rogue River Valley is next to the Willamette in extent on the west side of the Cascades, and is nearly two-thirds as large as the State of Rhode Island. Its soil is composed of the successive denudations of the surrounding mountains, and as they are the product of widely distributed geological eras, it is often found that several kinds of soil are deposited within a limited area, making diversified farming easy and practicable. Lying contiguous to California, and having its climate tempered by the warm ocean breeze, laden with moisture, it is specially favored as a locality for the most perfect flavoring and ripening of fruit; in this, Rogue River Valley always will excel. On the gentle slopes of the surrounding hills, thousands of acres can be put into vineyards and choice fruits, while on the low bottom lands anything and everything grown in a semi or sub-tropical climate can be produced. Ashland, Medford, Jacksonville, Central Point, Phœnix, Talent, Eagle Point, and Gold Hill, are the principal towns in the valley.

Approach this valley from whatever direction, an amphitheatre of mountains encircles it on every side, snow-crowned peaks on nearly every side, some of them reaching an altitude of eight thousand feet above the valley, and sending down long forest-covered slopes to the lower level. The extended sweep of graceful hills on either side of undulating valleys, rising to rugged snow-capped mountains, makes a picture unequaled in beauty and magnificence by any other land on earth, except perhaps by Switzerland with her Alps.

Out of 346,549 acres of surveyed land in this county 192,344 are in cultivation. Land may be bought from the Oregon & California Railroad at prices varying from $2.50 to $20 an acre, and from other land owners at reasonable figures, from $5 to $500 per acre, owing to location and degree of cultivation and improvements. Farming land sells at from $10 to $100 per acre, $25 to $50 per acre being the prevailing price. Wheat, Rye, Oats, Barley, and Corn grow well on all soils, and yield fine crops. The straw is bright and clean, free from rust or mildew, and the grain full, plump, and well matured. Of Wheat, the best lands produce from thirty to forty bushels, and of Oats, from forty to fifty bushels to the acre. Common grade land runs from five to ten bushels under the above estimate. Phenominal yields often produce sixty bushels of Wheat and eighty bushels of Oats to the acre. Corn yields from forty to sixty

bushels to the acre. Corn does not require so much cultivation as in most countries. Timothy, Clover, and Blue Grass do not do well on uplands, but make good crops on the low bottoms. Alfalfa grows anywhere, producing two good crops on the uplands and from three to four on the bottoms; or, with irrigation, Wild Oats once seeded produces successive crops without planting, and is much used for hay.

For a description of the mines and mining, attention is called to a special article on this subject. Mining, stock-raising, agriculture, and fruit-culture are the chief industries, though lumbering is destined to occupy additional attention as the country becomes more densely populated. The mildness of the climate and the absence of any prevailing disease among stock, makes this an inviting field for the stock-grower. Aside from Cattle, Sheep, and Horses, Swine and Poultry are specially profitable.

Applegate, in the western part of the county, and separated from Rogue River Valley by a mountain range, is a rare combination of mineral, agricultural and horticultural land, lying along the river bottom and between points and spurs, extending far into the foothills, where are located many comfortable homes, fine farms and gardens, with a vast extent of grazing lands in the adjoining mountains. Hydraulic and placer mining is carried on extensively along the Applegate River and its tributaries, while all kinds of semi-tropical fruits and berries are grown in sight of the most extensive hydraulic mines in the county. Evans Creek and Foote Creek, in the northern part of the county, also add a valuable pro rata to the agricultural and mineral wealth of the county.

The first settlements of the valley were in 1851, when gold was discovered in Jackson Creek, near where Jacksonville now stands. The mines proved both rich and extensive, and soon drew to this part of the State a large cosmopolitan population, and the wise agriculturists among them saw in this beautiful and fertile valley a growing and permanent wealth that would long outlive the glamour and rush of a frenzied gold excitement, and many of the finest farms in the valley were at once located under the Homestead Act, and are still in the hands of the original owners. For three decades this county grew and prospered, though completely isolated from the markets of the world. Our mineral resources amply supplied the circulating medium required for the general conduct of business, which, at that time, was very large, on account of the great number of people who had gathered here under the impulse of a new and rich discovery,—on account too of the high prices that prevailed for all necessaries, by reason of the excessive freight rates from the supply centers. Grain and fruit-culture were carried on solely to meet the demands of local trade.

Many of the early immigrants brought with them valuable Horses and Cattle, and stock-raising became a specialty. Large herds of Cattle were annually driven to the markets, north and south, and our Horses were improved by the importation of the best strains of blooded stock, until they have made for themselves a record as roadsters and draught horses that has placed them among the first on the coast.

The completion of the Oregon & California railroad to a connection with the Southern Pacific, under whose management the entire system is now oper-

ated, marked a new era in our progress and prosperity, and real estate rapidly advanced in value, immigration flowed in a continuous tide, new towns sprung up as if by magic, trade was divided and extended, and the future possibilities of this favored section became at once apparent. The fruit that year after year rotted ungathered for lack of means of transportation, now find a ready sale in the markets, north and south; and this branch of husbandry, through the discriminating judgment of its votaries, has been carefully fostered and extended, many new and superior varieties added, a more thorough system of pruning and cultivation observed, until to-day it is one of the leading and most profitable industries in the county. The original stock of Horses, Cattle, and Sheep has been improved by importing fine highly bred strains until now Jackson County contains stock of the best quality.

The culture of Grapes is receiving much attention in this county, the soil and climate being extremely favorable to the production of an abundant crop and an excellent quality. The average yield is about four tons to the acre. There are, in vineyards, from four to twenty acres each, belonging to different men, about eighty-five acres in all. The product is made into wine, some of it dried, and some it sold in Portland and in other local markets. The principal variety is the Miller Mission. The Sweetwater, the Black Hamburg, Concord, Isabella, Muscat, Rosa, Peru, Tokay, and many other varieties are grown.

Besides the vineyards mentioned are to be found a great number of small holders enjoying the luxury of their own "vine and fig tree." It is hard to estimate the acreage in vines, though new vineyards are being planted every year. It is destined to be the most profitable industry in Jackson County. The varieties of raisin grapes all do well, and some seasons without doubt raisins could be cured by the sun in the vineyard, but the experiment has not been tried. As yet, the only disease of the vines is mildew, occurring but rarely. A frost, appearing about the second week in May and recurring two years out of five, decreases the annual yield nearly, if not quite, one half in such years. Vines have been injured by winter freezing once in twenty-five years. The French method of pruning is the one in vogue; the vines are trimmed from the first of February to the last of April. No fertilizers are needed, and the best vineyards are not irrigated. The Indian summer, with its warm, hazy atmosphere, lasting from thirty to forty days, with possibly one shower of rain, makes a season for ripening of fruit equalled, perhaps, by no place on earth. Grapes are picked and shipped from the vines as late as the twenty-seventh of November. The last week in October is usually devoted to wine-making. Twenty-pound boxes of grapes sell at the vineyard for from 50 to 90 cents per box.

What is said of Jackson County in respect to grape culture applies with almost if not equal force to Josephine County, where there are many young vineyards being grown. Any hill land with east, south, or west facing, out of the severe frost limits and strong wind currents, ought to and will produce excellent grapes. Some parts of Douglas County will doubtless grow profitable vineyards, but the increased precipitation will militate against wine-making, without which extensive viticulture is attended with danger of over produc-

tion, though choice table grapes are grown in the Willamette Valley under far less favorable conditions. The dry, sheltered valleys of Douglas, removed from the streams and having southeast hillsides, ought to produce grapes equal to Josephine and Jackson Counties. Lake and Klamath are not grape-producing counties. Coos and Curry will doubtless never interfere with the larger vineyard growers of Jackson, Josephine, and Douglas. These three counties, excepting a part of Douglas, lie between the Cascade and Coast Range Mountains and are therefore sheltered from disastrous storms and winds. Jackson County, or the Rogue River Valley more particularly, is further protected from the coast moisture by a lofty spur of the Siskiyous on the west. It is a prevailing opinion among those best informed that champagne can be manufactured out of the wines produced in the Rogue River Valley. If this be true, and the light sparkling wines indicate it, a new source of revenue will be acquired by this favored locality. The conditions are analogous to the celebrated champagne districts of France, with better climatic conditions, being about the same annual temperature, the same rainfall, nearly a like distance from the ocean. The soil is different in that chalk beds are absent from the vineyards of Rogue River Valley, yet Chalk is found in several places, while Lime is found in close proximity to some of the best vineyards. Although the elevation of the vineyards of Southern Oregon exceed by nearly twice the elevation of those in France, yet the difference is equalized by their being several hundred miles nearer the equator. More than that, and the chief advantage, is in the longer season for ripening. The wine-making season for champagne in and about Rheims is the last of September or the first of October, while the wine-making season in the Rogue River Valley is just one month later, an advantage apparent to wine-producers, Indian summer in Southern Oregon being the most perfect imaginable. However this question may be settled by subsequent experiments, it remains a fact that the wines of Southern Oregon are gaining an enviable reputation in the markets, the yearly vintage being usually consumed before the close of the next season. If in the crude processes of manufacture and the cruder handling of the Southern Oregon wines this much can be said of them, what must the future bring forth?

Jacksonville, the county seat, was first settled in 1852, and incorporated eight years later. It is situated four and three-quarter miles from Medford, four and one half miles from Central Point (stations on the Southern Pacific Railroad in Jackson County), and three hundred and twenty-three miles from Portland. There are three hundred and fifty school children in the Jacksonville district. It contains a private bank, conducted by C. C. Beekman and T. G. Reames (capital stock, $55,000), Churches of the Methodist, Presbyterian, and Catholic denominations, a public school, a public hall, flour and planing mills, fire department, and weekly newspaper—the *Jackson County Times* (Democratic). Besides these, it has a brewery, distillery, florist, and the largest vineyards in the State in the immediate vicinity. Among its fine buildings is the Masonic Hall, costing $14,000. Nearly all the business houses are of brick. Some of the choicest fruit grown in the State is shipped from this point. It is one of the largest gold-dust shipping points in the State. It is picturesquely situated among the foothills to the west of Rogue River Valley,

and connected with Medford, on the Southern Pacific Railroad, four and one-half miles, by a railroad, which was built by the citizens of Jacksonville, and has proved for the town a valuable enterprise.

At the request of the City Board of Trade, Mr. C. B. Watson prepared the following description of Ashland: Ashland, with a population of 2,500, is situated near the southern end, or head, of the Rogue River Valley, on the line of the Southern Pacific, four hundred and thirty miles north from San Francisco, and three hundred and forty-three miles south from Portland, and is the end of the second division south from that city, also the end of the second division north from San Francisco; thus making it the central division station of the only railway line between the largest two cities on the Pacific Coast. It is situated at the foot of the Siskiyou Mountains, which rise within ten miles of the town to the height of eight thousand feet, where snow lies the year through. Many streams, with their sources in this snow, flow to the valley, the principal one flowing through the town. It furnishes an abundance of water power for driving all kinds of machinery. A system of water-works has been constructed by the people of Ashland at a cost of fifty-seven thousand dollars for domestic and other purposes, from which, at nominal figures, every household, garden, shop, or other place requiring it, may draw to their heart's content. There is an electric-light and power company, which gives a fine service in lighting the city and many residences, and is also engaged in manufacturing plants for other cities in California and Oregon. There are two sash, door and blind factories, one large flouring-mill, a woolen factory, and other manufacturing establishment , and Ashland Creek furnishes all the power for operating them. Ashland contains many elegant residences, nearly all of which are ornamented with lawns and flower gardens, fruit trees and shrubbery kept with good taste in fine condition. All classes of mercantile houses carrying good stocks, do a flourishing business. There are many elegant business and public buildings, among which may be particularly mentioned the Hotel Oregon, a brick building three stories high, of attractive style, modern architecture, complete in all its appointments, and finished and furnished with elegance, and costing in all thirty thousand dollars. The Depot Hotel, owned and operated by the Southern Pacific, and the Ashland House are good houses, furnishing excellent accommodations. There are three other hotels and a restaurant of more modest pretentions. The Ganiard Opera House is a three-story brick of elegant appearance. The Bank of Ashland is a substantial two-story brick. The Odd Fellows and Masonic Temples are each two-story brick structures. McCall's block, Johnson's block, the Thompson, Billings and Crocker blocks are all substantial brick structures. The City Hall is a new two-story brick, and is occupied by the various city officers, fire department, city jail, etc. The various places of worship are, the Methodist, Presbyterian, Baptist, Congregational, and Catholic, each occupying its own building, all fine church edifices.

Ashland is provided with a first-class system of graded public schools, open ten months in the year. Ten teachers are employed, and six hundred pupils in attendance. The schools are organized into primary, secondary, grammar, and high-school departments. There are eight years' work, three years of

which is of an English scientific character. Each grade is provided with all the necessary adjuncts to aid teachers while instructing their respective classes. Two newspapers are published weekly, the *Ashland Tidings* and the *Valley Record*.

Ashland Park, the nearest point of which is only three miles from town, has been temporarily withdrawn from entry by the President, with a view of setting it aside as a park, has a road running to it, and has already become a place of resort for the people of the city and valley. White sulphur springs, with baths, not inferior to those of Arkansas, are found within the city limits, and are patronized by thousands of people yearly, many of whom seek Ashland as a health resort.

Medford is an enterprising town on the Southern Pacific Railroad, thirteen miles north of Ashland, and five miles east of Jacksonville, in the center of the Rogue River Valley. It has a good public school, Baptist, Methodist, and Presbyterian Churches, a weekly newspaper (the *Medford Mail*), and a private bank. It contains a good roller flour mill, with a capacity of one hundred barrels per day, soda bottling works, and a distillery. The Grand Central is a good brick hotel, while there are other good houses for the traveling public. It has good city water-works, and an opera-house.

Central Point, also on the railroad, is a thriving town of 300 population, situated three miles north of Medford. It has a good public school, a church building, a good hotel, city water-works, and is very nearly in the center of the Rogue River Valley.

Gold Hill, Phœnix, Eagle Point, Uniontown, and Talent are small towns doing a good trade, and situated in the midst of a fine agricultural and grazing section.

The total valuation of all property in this county returned for the purposes of taxation in 1891, was $5,476,025.

JOSEPHINE COUNTY.

By SOUTHERN OREGON STATE BOARD OF AGRICULTURE.

Josephine County is bounded on the south by California, on the east by Jackson County, on the north by Douglas County, and on the west by Curry County. It is essentially a county of hills, mountains and valleys, containing no broad area of plains or level lands. Its picturesque beauty is beyond description, and its area of tillable land, while not so extensive as some other counties in the State, cannot be equaled for fertility and variety of products by any other portion of the United States. Fruits of all kinds except tropical grow here to perfection. The small fruits do nicely, while vegetables of all kinds acquire a size and flavor not surpassed by any country. The shipping of fruit is a profitable business in Josephine County. At the time of writing, thousands of dollars' worth of Watermelons, Apples, Peaches, and other fruits have been shipped from Grant's Pass to points in California, Oregon, Washington, Montana, and Idaho, and still the shipments go on almost every day. For the last two years Apples have been a very profitable crop. Many Potatoes and other vegetables are also shipped. Good timber abounds all over the county. Much

of it is at present inaccessible for the want of transportation, but this will be remedied in the near future. Sugar Pine is the finest wood that is produced for fine work, such as mouldings, doors, etc. Yellow Pine is also much used, while for strong rough work, Fir stands unrivalled. For ornamental work, Manzanita, Laurel, Alder, and the different varieties of Oak are used. There are seven or eight sawmills in operation within a radius of fifteen miles of Grant's Pass. Most of the lumber manufactured in the county is either marketed at or shipped to other places from Grant's Pass.

In the matter of climate, Josephine County is particularly fortunate. The winter is very mild. It is very seldom that the thermometer ever gets to the freezing point at midday, and 10° above zero is as cold as it generally gets mornings and nights during the coldest weather. In the summer it is rarely warmer than 100°, and then for short intervals only. A seabreeze blows most every afternoon during the summer up the Rogue River Valley and cools the atmosphere. The annual rainfall is 25 inches, and most of the rain falls in the winter, although showers come at regular intervals until the latter part of June, thus insuring good crops. A failure of crops here is unknown, although some years the yield is larger than others. For all bronchial, pulmonary, neuralgic, and rheumatic complaints the climate is particularly favorable, very few cases of these diseases originating here.

Hunting and fishing are very good. The mountains are stocked with Deer, Bear, Panthers, Wild Cats, and kindred animals; while the feathered creatures are represented by the Pheasant, Quail, etc., and in the season, Ducks and Geese are to be found in the Rogue River and in grain fields. The Rogue River contains many fish of different varieties, while the mountain streams, if not mined, contain Speckled Trout.

Stock does well in Josephine County, and owing to the mildness of the winters does not require much feed. There is considerable fine stock in the county already, but there is plenty of room for more. Stock-raising, when carried on intelligently, pays very well indeed. Contagious and epidemic diseases of stock are almost unknown.

Placer mining has been carried on extensively in the past, and millions of dollars have been taken from the ground in this way during the last forty years, when Josephine County was isolated and unknown. Unfortunately, all this money went to other places, very little remaining here. Placer mining is now on the wane, but good diggings are liable to be discovered at any time, as much prospecting is being done in this line of mining. Quartz is attracting a great deal of attention from outside parties, as well as resident prospectors. Several ledges are showing very good prospects indeed, and have attracted considerable notice. There are several arrasters in operation at present writing, and the results so far obtained justify the conclusion that in the near future there will be many large stampmills in operation day and night. All that is needed to make Josephine County a large mining center is intelligence, energy, and capital.

Grants Pass, the county seat, is a thriving town of 3,000 inhabitants and only eight years old. It is situated on the north bank of Rogue River, and the Oregon & California division of the Southern Pacific system runs through

it. The town is about half-way between Portland and San Francisco, and ships products in both of these directions, and also buys of both cities. There is a good public school, and an able corps of teachers. The building is of brick, has ten rooms, and is modern and convenient in all its appointments. The different religious denominations that have churches, are the Methodist, North and South, Presbyterian and Baptist. The Sugar Pine Door and Lumber Company have their factory here, and employ two hundred men in their business. This concern brings ten thousand dollars per month into Grants Pass, and its importance cannot be over estimated. A second sash and door factory has also been built, and in a short time will be in operation and employ a large number of men. There are two brickyards, three lumber-yards, two large planing-mills, wagon, carriage, shingle, broom, and match factories, and four sawmills, all within a radius of six miles. A roller flour mill is among the near probabilities. The Water, Light and Power Company have fifty thousand dollars invested in a water and electric-light plant, furnishing arc and incandescent lamps for streets and stores. The Rogue River can be made to furnish an immense water power for manufacturing, just as soon as the right parties come along to utilize it. The railroad shops are located here, and employ a good force of men all the time. This point is also the end of a freight division. The First National Bank of Southern Oregon commenced business on January 1, 1890, with a capital stock of fifty thousand dollars. A new opera-house has been completed this year costing, completed, nearly nineteen thousand dollars. Many other improvements too numerous to mention are also being made, and at the present rate of improvement it will be only a few years before Grants Pass will be an important city in the great State of Oregon. People desiring to make pleasant homes in a pleasant climate, and with pleasant surroundings, are sure to be pleased with Josephine County.

Speaking of the fruit interest of Josephine County, A. H. Carson, of the Redland Nursery, says: "Josephine County has grown fruit since its first settlement, but it is only during the past five years that the industry has received any special attention. Until that time fruit was like Topsy—'it just growed,' without care or cultivation. There was no system, no choice in varieties, an apple-tree was an apple-tree; a peach tree, be it seedling or budded fruit, was all the same with the early tree-planters of Josephine. Still, fine fruit for the home market was grown by the early tree-planters. That market was limited, consequently the industry was comparatively dormant until the Oregon & California Railroad was completed, seven years ago. Since that date the energetic land owners of the foothills in and around Grants Pass, and on the Applegate and Rogue Rivers, realized that their holdings paid 10% on a very high valuation if planted in fruit, such as apples, peaches, pears, plums, and prunes, and the result has been that there has been over two hundred thousand fruit trees planted out in orchard during the past five years in Josephine County.

"I have had fifteen years' experience in growing fruit in Josephine County, and in this paper it would perhaps be as well to give a few of the real possibilities of fruit-growing in this locality. All old tree-planters in Josephine prefer one-year-old trees to start an orchard with (non-irrigated). Peach-trees, one hundred and sixty to the acre, with good cultivation, will come into bearing

the second year after planting, and will produce at that age about thirty pounds of fruit, which usually brings from two and a half to three cents per pound. At seven years old I have had Peach trees that produced three hundred and twenty pounds of marketable fruit. The Apple grower has to wait longer for his tree to become productive. Usually at six years old they begin to produce fruit in abundance. This year off of five seven-year-old Spitzenburg trees I picked seven hundred and twenty pounds of choice Apples. Apple-trees on hill land are planted 20x20 feet, one hundred and eight trees to the acre. Prune-trees we plant the same as Peaches, one hundred and sixty trees to the acre. At the age of five years they become profitable. They will produce from twenty to thirty pounds of dried fruit at that age, which usually brings from seven to nine cents per pound. The importance of the Prune industry in Josephine county is just beginning to be realized. There are thousands of acres back from ten to fifteen miles from the railroad that are adapted to Prune culture, that at the present time is cheap, and can be made very valuable planted in Prune orchards. Pears are grown here to perfection, although in that line of fruit there are but few large orchards planted. They commence bearing at five years old and become profitable at seven years old.

"Grapes grow and thrive to perfection in Josephine County, both American and foreign varieties. There are hundreds of locations in Josephine County adapted to the Grape, and it is only a question of time when wine and table Grapes will be one of the leading industries of this county. I have grown at my place (Redland) the famous White Muscat of Alexandria, Rose of Peru, Muscatel, and Black Hamburg for the last five years, of size and flavor equal to anything I have seen from California.

"The fruit industry of Josephine County is yet in its infancy when we compare the amount planted in orchards to the area susceptible of being planted. I have no data to determine the number of boxes of Peaches shipped north this year from Josephine County, but of Apples there were grown and shipped from this county on the first of November 8,500 boxes of one bushel each. What the number will be when the trees that have been planted out come into bearing five years from now can be approximated by those interested in the production of fruit. Josephine County in the production of fruit is destined to become wealthy and prosperous. The climate and soil she has. Energetic, intelligent, go-ahead immigration she needs."

The value of all property in this county, as returned for the purposes of taxation in 1891, was $1,621,918.

Klamath County.

By Southern Oregon State Board of Agriculture.

Klamath County is a very interesting section of Oregon. Situated on the eastern slope of the Cascade Mountains, several miles from the railroad, it is a "Wayback" region. With its green valleys and beautiful lakes smiling and glistening at the feet of majestic mountains, it wins the admiration of lovers of natural beauty. Here the home-seeker finds valleys as fertile as he could wish; the timber hunter and the millman see virgin forests and the

finest water power in the Northwest, and the artist and the poet behold broad lakes all aglow with the witchery of Modoc legends.

Klamath's geological formations have been examined, and the few travelers who have been here have praised Klamath's hot and cold springs, its rapid streams, and its fine Venison, Trout and Duck. But its fine agricultural and grass lands, its wealth of Pine timber and its manufacturing advantages must be seen to be appreciated. They can be described here only in general terms. They are great, but to fairly represent them by written words is to deprive the writer of time he is unable to spare.

The area of Klamath County's timber land is about one and a half million acres; the area of the grazing land is over half a million acres, and that of the agricultural land about the same surface. The Klamath Indian Reservation contains half a million acres, of which one half is woodland and the other fine grazing land. Government land is $2.50 an acre, School and State lands, $1.25 an acre, and the Agricultural College lands, $2.50 an acre.

Klamath County has several lakes, two of which, the Upper Klamath and the Lower Klamath, are large, deep and navigable. Upper Klamath is thirty miles long, by an average breadth of eight miles. Lower Klamath, nearly as large, stretches to the south, past the famous lava beds in California. About the borders of these lakes is a large area of very valuable marsh lands. The lower lake, deep, bright and in the midst of a beautiful combination of natural views, is navigable from Linkville, its northern extremity, to its southern end, thirty-four miles. Lake of the Woods and Buck Lake are charming little sheets of water drained by the Des Chutes River, and Crater Lake, in the mountains to the west, is one of the most remarkable sheets of water on earth. It glimmers at an altitude of 6,300 feet above the ocean level, is eight miles long by six wide, 1,996 feet deep, surrounded by vertical walls, rising to a hight of from 1,000 to 2,200 feet, and has the clearest, coolest, purest, sweetest water in the world. It occupies the crater of an extinct volcano. The climate is so cool, the scenery so beautiful, and Trout and Venison so abundant in the vicinity of Crater Lake that it has already become a famous resort for tourists in the summer season.

Between the two lakes, on Link River, stands the city of Linkville, 4,000 feet above the sea level. It is the centre of the great Klamath basin, and the county seat. It has about 700 inhabitants, and is a very important trading point for the interior of Southern Oregon. It has a fine church building, courthouse, public school, and a business street over half a mile in length. Situated at the foot of a rushing river, Linkville has unrivalled privileges of water power, the full capacity of which will be realized when railroad communication is more direct.

Three different railroad lines are presenting their prospects for Klamath County. The Oregon Pacific, the Oregon Short Line, and the Southern Pacific have sent surveying parties to make a thorough examination of the country, and there is nothing more certain than that one of these companies will soon construct a line through it. The recent visit of Leland Stanford to New York has developed the rivalry to get a railroad hold on the new country, which embraces not only Linkville and Klamath County, but also a much

larger range containing flourishing young settlements, and Linkville's immense water power and central location will make that young city the objective point for the road.

The most valuable resources of Klamath County are the immense water powers of the Link and Klamath Rivers. Their reservoirs are the inexhaustible lakes from which the water flows so evenly the year round that no manufactory upon the bank of either river can ever suffer for want of water. Boats will bring to Linkville the products of all the lake region, and the great sawmills must depend upon Klamath County for timber. Linkville's water power even now offers most powerful inducements for the establishment of a large woolen mill. The sixty-five feet fall of water sings pretty loudly to capitalists in the cloth-manufacturing line. It says, "Here I am; a water power superior to that of Spokane Falls, and yonder is the Wool of Lake, Harney, Grant, and Malheur Counties."

Wheat, Rye, Oats, and Barley thrive wonderfully in Klamath County, even volunteer crops of Wheat turning out as high as thirty-five bushels to the acre. The native grasses are very rich, and of the tame grasses only Red Top, Timothy and Alfalfa have yet been raised to any great extent, but they bloom finely Apples, Plums, Cherries, and berries grow in abundance, and the few Peach-trees that have been planted thrive wonderfully. No better country for raising Horses can be found, and the business is very profitable. Cattle for beef and dairy purposes are sent to Portland and San Francisco every year. Hog-raising is very profitable.

The health of Klamath County people is always first-class.

Good farming land may be purchased near Linkville for from $10 to $40 an acre. Town lots sell at from $50 to $300, and never before were the prospects for substantial growth as good as now.

Linkville is the county seat, pleasantly situated on Link River, which stream is one mile long, and connects the upper and lower Klamath Lakes, and furnishes an immense water power This power is now used to propel a flouring mill, a saw and shingle mill, and a sash, door and blind factory The town is provided with a good public school, employing three teachers, Presbyterian, Baptist, and Christian Churches, and a weekly newspaper (the *Star*), lodges of Odd Fellows, Masons, and A. O U. W The court-house and two large hotels are the principal buildings. It contains mercantile establishments, and ships grain and live stock. Population, about 800. Upon the whole, Linkville is a most desirable town for a good, wide-awake business man, and Klamath County, with its wealth of timber, grazing, and farming lands, its lake and river advantages, its healthfulness and natural beauty, is abreast of any other county in the State as a section for the home-seeker, the capitalist, the health-seeker, or the tourist.

The value of all property in the county returned for the purposes of taxation in 1891, was $2,050,121.

Lake County.

By The Lakeview Board of Trade.

Lake County is situated in the center of the great lake region of Southern Oregon, and on that account and its high altitude, is subject to more moisture than the other portions of Eastern and Southern Oregon. It is bounded on the south by the California line, on the east by Harney County, on the north by Crook, and on the west by Klamath. It is one of the most favored sections of the Pacific Slope, and is rapidly settling up with an industrious, thrifty, and prosperous class of citizens. The people are generally well to do, and most of them are making money. The society is remarkably good and orderly for a frontier community. There is very little poverty, and the crime calendar is light. It contains an area of about nine thousand square miles, and, as its name implies, contains a number of lakes.

The great Goose Lake is partly in Oregon and partly in California. It is about fifty miles long, from eight to fifteen miles wide, and from twelve to forty feet deep, and is therefore navigable for vessels of considerable draught. No finer inland body of water can be found anywhere.

The other principal lakes are: Warner, Albert, Summer, and Silver Lakes. These lakes, like the beautiful rivers and streams that empty into them, abound with fish.

The surface of the country in Lake County is varied by beautiful valleys, rolling hills, sage-brush plains and low ranges of mountains.

The soil is diversified, consisting of rich black loam, sage-brush loam of different grades, and in some places sandy. Nearly all of the various grades of soil are productive when properly cultivated. The bottom lands are very rich and produce abundant crops of native grasses for hay, and also fine Timothy and other tame grasses, as well as fine crops of cereals and vegetables of all kinds in abundance. The hills and rolling lands also produce fine agricultural crops. The sage-brush lands, of which there is an abundance, are now being taken up, and, with good cultivation, are made good agricultural land and produce remunerative crops. Irrigation is no longer considered necessary for grain and vegetables.

There is generally plenty of timber for domestic purposes, and in some sections of the county vast bodies of the finest qualities of the Sugar Pine, Cedar, and other valuable timber for commercial purposes. This is particularly true of the southern and western portions of the county, where fine timber is of easy access.

Stock-raising has been the leading industry of the country, and always will be a remunerative business. The geographical condition of the country, together with the moisture caused by the lakes, will always give it superior advantages for stock-raising. The hills and mountains are covered with a luxurant growth of Bunchgrass up to the highest summits. These great ranges will always furnish abundant pasturage for stock.

But little attention has been paid to farming until within a few years, as the great distance from lines of transportion makes the export of products

impossible, but the settlement of the country has increased the demand, and the prospects of a railroad at an early day has stimulated attention to agricultural pursuits. There is a large amount of fine agricultural land besides the sage-brush lands, which were formerly supposed to be comparatively worthless, but which, within the last few years, have been sufficiently tested to prove that good crops can by raised thereon. Of the sage-brush lands there is a vast amount unoccupied. As fine crops of grain, hay and vegetables are raised in Goose Lake Valley as are produced anywhere. All the hardier varieties of fruit, such as Apples, Pears, Prunes, Plums, and all kinds of berries, produce abundantly.

The number of Horses in the county is estimated at 30,000, Cattle at 75,000, and Sheep at 250,000. There is annually exported by the merchants of Lakeview 1,750,000 pounds of wool. There is also a large export of Horses, Mules, beef and mutton.

Crops of Wheat, Rye, Oats, and Barley yield abundantly. Wheat has yielded sixty bushels to the acre, and will average forty bushels each year. This is not a Corn country, the nights being too cool; still, green Corn for table use is grown abundantly in the gardens. Grain is ground by mills at New Pine Creek, Willow Ranch, and Paisley.

The native grasses, of which the Bunchgrass is the principle, are exceedingly nutritious, and have long been a source of wealth to the stockmen. The quality of the beef raised in this country is unsurpassed anywhere. Of the tame grasses, only those of Timothy, Redtop, and Alfalfa have as yet been cultivated to any extent, and they do well.

The lands of Lake County may be divided into three classes, to wit: swamp, wagon road, and Government lands. There are large bodies of swamp land, the title to which has not yet been confirmed; hence, the claimants can do little or nothing toward utilizing them. It is unfortunate that this question has been so little understood by our lawmakers, and that nothing has been done to settle these questions that have vexed both the State and individuals for the past seventeen years. The failure of the State to have these lands examined and approved, has made other reclamations by the claimants an impossibility heretofore; hence, it is quite certain that but little of that which is actually swamp land will be forfeited. Large tracts, however, that have been heretofore held illegally as swamp land are being restored to the Government and opened for settlement. The wagon-road grants are still unsettled, though it is thought they will eventually be thrown open to settlement under the homestead and preëmption laws of the United States. There are still some very fine bodies of agricultural lands open to entry under the laws, and any one seeking a place to make a home will find little difficulty in satisfying himself.

There are two salt marshes—one on Silver Lake and one on Warner Lake—that produce an abundance of Salt of excellent quality, which, gathered in its natural state, is almost equal to the Onondaga solar salt. These two marshes will doubtless, in the near future, produce all the Salt necessary for Southern Oregon and Northern California.

According to the observations of the Signal Service, at its station at Lakeview, the lowest temperature reached in the winter of 1884–5 was three degrees above zero. The mercury seldom falls below zero, and when that occurs it does not generally remain there more than three or four days, but rises again. In one exceptional winter, during the last eleven years, the mercury once touched twenty-six degrees below. The greatest depth of snow in the winter of 1884–5 was three inches, but at no time did it remain on the ground longer than ten days. During the last eleven years snow twice reached the depth of two feet, and once laid on the ground twelve weeks. But it is unusual for snow either to fall so deep or to remain so long on the ground. During most winters stock runs at large on the public range, without care or shelter, and do well. In the summer, the thermometer, during the hottest days, ranges from seventy to ninety degrees, and on a few occasions it has reached ninety-four degrees. Like all other places on the Pacific Coast, the nights are generally cool. Summer rains or thunder-showers occur here, but not so frequently or to the same extent as in the Atlantic States. Average annual rainfall, about nineteen inches.

Lakeview, the county seat of Lake County, and seat of the United States Land Office, is the principal town of the county, and in fact the principal town in the great lake basin. It is situated on the east side of Goose Lake Valley, and about three miles north from the head of Goose Lake. The valley at this place is about twelve miles wide, and the valley proper about sixty miles long, with a large number of fine mountain streams coming down from the everlasting snow peaks, and numerous small valleys extending far into the mountains. Lakeview is about the center of the valley north and south, and is of easy access from Warner Valley on the east, Drew's Valley and Sprague River on the West, and Crooked Creek, Summer Lake and Silver Lake Valley on the north. It is therefore centrally located in the heart of the finest portion of Southern Oregon, and controls the trade of a large district. The Union Pacific Railroad has located its line through this town, and everything indicates a bright future for it. The population is about 1,000, and is increasing rapidly. It has a $14,000 school-house, and a well organized school with four competent teachers, and is well calculated to furnish educational facilities for the town and surrounding country. It is also the intention to add an academic course next year. There are two churches. The Independent Order of Odd Fellows, Masons, Ancient Order of United Workmen, all have large and flourishing lodges, and the Grand Army of the Republic have organized a post. The Lakeview Water Company has nearly completed a good system of waterworks for house use, fire purposes and irrigation. The town is incorporated and has a good city government. There are two boiling hot springs near the town with medical properties, one of which has been purchased with a view of establishing a sanitarium. A beautiful view of the Goose Lake Valley, the lake and surrounding hills, is afforded from the town. The *Lake County Examiner*, a live newspaper, is published here.

Lakeview contains two hotels, three restaurants, two hardware stores, four general merchandise stores, four blacksmith shops, four saloons, two breweries, one newspaper and printing office, two livery stables, two wagon shops, one

jeweler, one shoemaker, one public school-house, two churches, the United States Land Office, one court-house with county offices and jail, two physicians, five law offices, two real-estate offices, two harness and saddlery shops, and two barber shops; also, near the town are three sawmills, one flouring mill, one bath house supplied with hot spring water, one limekiln, with plenty of limestone, and an abundance of good stone for building purposes.

Paisley, the second largest town in the county, is pleasantly situated on the Chewaucan River, forty miles north of Lakeview. It is in the center of a prosperous farming and stock country, and has one of the finest roller flouring mills in the State. It has superior water power for manufacturing purposes.

Summer Lake is a trading point twenty-five miles north of Paisley, and is surrounded by a fine agricultural and stock country.

Silver Lake is thirty miles north of Summer Lake, and is surrounded by a large and wealthy community.

New Pine Creek is a small trading point on the State line, fifteen miles south of Lakeview

The value of all property in this county returned for the purposes of taxation in 1891 was $2,356,023.

LANE COUNTY.

From the EUGENE REGISTER, INDEPENDENCE EDITION, 1891.

This is the fourth county on the coast, south from the Columbia, and has a western frontage on the Pacific of about twenty miles. It extends east across the Coast Range with about the same width into the Willamette Valley, where it spreads out over a large area on both sides of the river, gradually widening to the summit of the Cascades. It is bounded on the north by Benton and Linn, on the east by Crook and Klamath, on the south by Douglas, and on the west by the Pacific Ocean. It is one of the largest counties in Western Oregon, extending about one hundred and fifty miles east from the borders of the Pacific Ocean, and about fifty miles north and south. The county contains about 3,000,000 acres of land. Of this probably about 500,000 acres are under cultivation, while the balance is mountainous and grazing land, part covered with a dense growth of Oak, Ash, Maple, Cedar, Hemlock, Fir, Spruce and other valuable timber. From the northern boundary of the county to Eugene, and several miles beyond, is a large, open territory, known as the head of the Willamette Valley. This territory comprises over three hundred square miles of the finest kind of agricultural and grazing land. This is the most thickly settled portion of the county, and is dotted with substantial farm houses, showing thrift and prosperity. The farms contained herein vary in size from twenty to two thousand acres. During the past few years many of the large farms in this section have been cut up into fruit farms of ten to twenty acres each, and a great many more could profitably be divided in this way and this region made to support ten times its present population in good circumstances.

To the east and west of this strip of territory are the foothills of the Cascade and Coast Ranges of mountains, among which are hundreds of fertile valleys, some of them twenty-five miles long and several miles wide, and others large enough for only a few families. These valleys are rapidly filling

up with industrious people, who by their thrift and energy are making for themselves comfortable homes. These valleys contain rich alluvial deposits, very productive and especially adapted to the growth of fruit and Hops. Most of the hills surrounding these valleys furnish fine grazing lands, affording pasture for stock the year round. Some of them are densely covered with timber, valuable for lumber, and many sawmills are established on the streams among them. From these mills good timber is sold at from $10 to $12 per thousand. The entire county is coursed by numerous streams, having their sources in the timbered mountains, furnishing pure water and motive power for manufacturing and other purposes. The principal streams are the Willamette, McKenzie, Siuslaw, Coast Fork, Middle Fork, Blue, and Mohawk Rivers, each of which has numerous small feeders.

The basin of the Coast Fork is a valuable section of Lane County. The river rises in the mountains on the south of the county, and flows in a northeasterly direction. Through a distance of twenty-five or thirty miles above its junction with the Willamette River are many fine farms and stock ranches and some of the best land in Western Oregon. In this section are located the thriving towns of Creswell, Cottage Grove, and Latham, through which passes the Southern Pacific Railroad on its way up the main branch of this stream. All the valley and much of the hill land has been taken up, but much of it can be purchased from present holders at low prices. The east branch of the Coast Fork, known as Rowe River, is its largest tributary, and near its source is located the Bohemia Silver mine. Along this stream are many beautiful and fertile valleys, surrounded by hills densely covered with timber valuable for lumber. The Coast Fork Basin contains a population of about 2,500, engaged in agriculture, horticulture and stock-raising.

Northeast from Cloverdale, and separated from it by a range of low hills, is Pleasant Hill precinct, containing a much larger area, and forms one of the most valuable sections of the county. A postoffice, store, school, church, and some small shops are located in the center of the settlement, and it is altogether one of the most desirable portions of the county in which to reside. Other points of interest in what is known as the Middle Fork country are, Rattlesnake Valley, Big Prairie, Little Prairie, Kitson Springs, and Pine Openings. The valleys mentioned are but partially settled, and do not differ materially from others in the county in quality and production. The springs mentioned are noted as a health resort and headquarters for sportsmen and those seeking recreation. The forests abound in game, and the rivers and lakes in this region in fine fish. Along the banks of the Middle Fork winds the old Oregon Central Military Road. The country abounds in the finest timber, and in some places excellent pasturage is found; but few settlements have so far been made on the line.

The town and precinct of Springfield lies east of Eugene, and is one of the most wealthy in the county, comprising the country lying along the McKenzie River for eighteen miles above its mouth, and bounded on the west and south by the Willamette and Middle Fork. It contains some of the finest grain- and fruit-producing land in the county, and is the best improved of any portion. Land is valued at from $15 to $40 per acre, and some of it could not be pur-

chased except at a much higher figure. Further east are thousands of acres of mountain lands, lying along the McKenzie, yet unoccupied. Here many good locations may be found and comfortable homes made. Foley and Belknap's Springs are toward the headwaters of this stream, which have obtained a reputation for their medicinal qualities, beneficial to those suffering especially from rheumatism. Both have been improved, and patients and others find good accommodations at the hotels by these springs. The Mohawk Valley lies west of the McKenzie; well adapted to stock raising, farming and fruit. Timber is of fine quality, and many sawmills are in operation.

Just above the mouth of the McKenzie and extending down the Willamette about nine miles is the precinct in which the town of Coberg is situated. It is composed mainly of rich prairie land fairly well improved. A branch of the Southern Pacific Railway passes through this section to its junction with the main line at Woodburn in Marion County To the west and northwest of Eugene, growing from valley to hill, and on to mountains until the ocean is reached, is well settled, the people engaged in farming, fruit-growing, stock-raising and lumbering.

The soil in Lane County is generally of a mellow, loamy character, which is easily worked, retains moisture, and is so rich that it produces wonderful crops. Many of the fields now yielding thirty bushels of Wheat to the acre have been in cultivation for over thirty years without ever being manured, and with only an occasional summer-fallow The soil in the river bottoms is especially well adapted to raising vegetables and fruit, being rich, mellow and loamy. Every known vegetable can be raised here in abundance and of the best quality. The average yield of Wheat is twenty-five bushels to the acre; Oats, fifty bushels; Barley, sixty bushels; Potatoes, three hundred bushels; Hops, fifteen hundred to two thousand pounds to the acre. Never in the history of Lane County has there been a failure of crops.

Wheat-raising is now the principal occupation of our farmers, though diversified farming and the raising of fruit and vegetables are rapidly coming to the front. The annual production of Wheat amounts to about 550,000 bushels of first-class quality, and makes excellent flour Lane is one of the most extensive Hop-growing counties in the State. The annual product is about 5,000 bales, or 1,000,000 pounds. At the average market price this crop brings to the county from the outside about $250,000 every year.

Wool-growing is not carried on extensively, though nearly all the farmers keep a few Sheep, and the annual clip is about 200,000 pounds. The average market price is about twenty cents per pound. In addition to the articles already mentioned, we market Potatoes, fruit of nearly all kinds, Hay, Oats, Barley, Rye, Flax, Buckwheat, Salmon, and dairy products extensively. We are caring for 8,000 Horses, 25,000 Cattle, 30,000 Sheep, and 15,000 Swine.

The summers are usually dry during the months of June, July and August. Only twice in forty years have crops been seriously injured by summer rains, and grain invariably stands erect until harvested. Some winters there is a light fall of snow in this region, but it has never been known to lay on the ground more than two to four weeks. Mercury as low as zero seldom occurs in this region. The ocean breezes which fan this section in summer prevent

any intense heat, and such a thing as sunstroke or nights so sultry as to prevent sleep is entirely unknown. There are no sudden changes of temperature.

Siuslaw Bay, in this county, admits, in its present condition, vessels of fair size, which trade with San Francisco and Portland. The principal commodities for shipment are Salmon, agricultural products, and lumber. The valley of the river and bay contains rich land, mostly heavily timbered, but particularly well adapted to the growth of fruit and to dairying. There have been cleared for the plow 5,000 acres of land in this valley during the past year. Florence, a thriving town, is situated on the Siuslaw River four miles from its mouth. It contains two hotels and mercantile houses, a public school, churches, and a newspaper The Florence Salmon Canning Company employs one hundred and twenty-five men and forty boats, and is capable of putting up six hundred cases of fish daily. The Lone Star Packing Company employs sixty-seven men and sixteen boats, and can put up five hundred cases daily. The Elmore Packing Company has one hundred and forty-five men and forty boats, and will turn off six hundred cases per day. The Government has made an appropriation of $50,000 to improve the harbor, and a light-house will soon be constructed, to cost $80,000.

Of the agricultural counties of Western Oregon, Lane is one of the most fortunate in situation, quality of soil, variety of products, value of natural resources and salubrity of climate. Situated at the head of the Willamette, lying on both sides of the river, its large area of fertile soil adjacent to fine water power, and on the line of the Southern Pacific Railroad, makes access to every part an easy matter. The Willamette River is navigable through this county during a portion of the winter season, and with a small outlay it could be made fit for the passage of river steamers during a large part of each year. The United States Government could not invest money that would more greatly benefit a rich and promising country than in this improvement. In area, Lane County is among the largest of its section, containing over 3,700,000 acres of land, the largest part of which is susceptible of cultivation. Not half of the available part is under any kind of culture, and that which is occupied is in the main in too large bodies to admit of the best results. Many of these large tracts are being subdivided every year, and are being sold at low prices, considering their location, improvement, and many advantages by which they are surrounded.

The value of all property returned for the purposes of taxation in 1891 was $8,523,158.

Eugene, the county seat, is the principal town in the county, located near the Willamette River, and on the Southern Pacific Railroad. It has a population of about 5,000, and is a substantial business center for a wealthy surrounding country. It is provided with a splendid system of water-works, is lighted by electricity, has a street-car line, an efficient fire department, commodious and well improved streets, and presents a beautiful appearance. It is the seat of the State University of Oregon. This institution offers a thorough collegiate course, a college education, free to those who will avail themselves of the opportunity. There are four courses: the classic, scientific, literary, and English. The university consists of three brick buildings, large, convenient, and

modern. Each department is thoroughly equipped with all appliances, mathematical, chemical, philosophical, etc., which enable teachers to properly illustrate each subject presented. There is also a splendid public school system; two capacious, modern buildings are occupied, one costing $12,000, and the other, lately finished, costing $11,000. There are three newspapers published, two weekly, and one daily and weekly. All the different denominations are represented, and many of the houses of worship are magnificent edifices. Manufacturing is represented by two tanneries, two sash and door mills, one furniture factory, two machine shops, one dynamo factory, one flouring mill, two wagon and carriage factories, and two breweries. Lodges of Masons, Odd Fellows, A. O. U. W., and Knights of Pythias meet regularly, each having a large membership.

Cottage Grove, Junction City, Springfield, Creswell, and Coburg are all thriving, growing towns.

Linn County.

The shape of the county is nearly that of a rectangle, though wider at the west end than at the east end. The width of the county is about forty miles; the length, about seventy miles, and contains 2,400 square miles, or about one and a half million acres. The Willamette River forms the western boundary, the Santiam and its north fork form the northern boundary, the summit of the Cascades its eastern boundary, and a surveyed line its southern boundary. The western part of the county for a distance of twelve to twenty miles east from the Willamette River is level prairie country, having but little timber except along the various streams that rise in the central and eastern part of the county. Lying east and adjacent to this prairie land there are tracts of land level in part and sometimes rolling, which vary from five to fifteen miles wide, and further east commence the foothills of the Cascade Mountains. The foothills at first are low and gently rolling, but on nearing the Cascades become larger and more precipitous. The eastern part of the county is the western slope of the Cascades, and besides much fine grazing country, furnishes vast quantities of timber valuable for lumber.

The timber is composed of White, Yellow, and Red Fir, Cedar, Pine, Alder, etc. The central part of the county is generally of a rolling and hilly character, covered with brush and timber, interspered with little skirts of prairie bottoms along the creeks and rivers which empty into the Willamette. The South Santiam River rises in the Cascade Mountains and flows westerly and northwesterly, uniting with the north fork about ten miles above its confluence with the Willamette. It divides the county in two nearly equal parts —the south and north half. The north half between the North and South Santiam Rivers, a large part of which is rolling brush land, although there is considerable bottom, prairie, and table land on the hills and lower mountains. The brush lands in this section are excellent for grain, fruits, and vegetables. It requires labor to clear them, but after they are put in a state of cultivation they are very productive and will abundantly repay the labor bestowed upon them. Scarcely one half of this northern division is yet surveyed — the eastern part of which is almost entirely unsettled. Much of it is unfit for agricultural

purposes, being mountainous and covered with extensive forests. The soil in the settled part of this division is principally sandstone and basaltic, and is productive of good results in vegetable- and grain-raising. The whole of this section is well watered and drained by numerous small streams. It is especially well fitted for stock-raising and dairy purposes. Much of the land along the foothills is not enclosed and stock is free to run at will.

The south half of the county includes all that part of it lying south of the South Santiam River. The eastern portion of this part of the county is very much like the eastern portion of the northern half. The western portion contains at least four fifths of the population of the entire county, and about eleven twelfths of all the taxable property. This belt from the Willamette to the foothills varies from twelve to twenty-five miles wide, is an open prairie country, and very productive. The land is all taken up, but farms may be purchased at figures ranging from $12 to $50 per acre, according to location and quality and extent of improvements. All kinds of grain and fruits and vegetables grow well and are cultivated extensively. Corn does not do very well in any of the Willamette Valley counties. Wheat is the staple production of this, as it is of all the Willamette Valley counties. Along the borders of the Willamette and Santiam Rivers is a strip half a mile or so wide of rich bottom land covered with brush and timber. At present only a small portion of it is cultivated, although for fruit and garden purposes no better land can be found.

This county is well supplied with transportation facilities. The Southern Pacific crosses the county from north to south along the western side; the Oregonian Railway crosses it from north to south along the eastern side; the Oregon Pacific crosses it from east to west through the central portion, while the Willamette River runs along the western side of its entire length, the river being navigable to Harrisburg during most of the year. There is a branch of the Southern Pacific running from Albany, the county seat, to Lebanon, thirteen miles east.

The general character of the soil is a dark loam, containing a large porportion of vegetable mould, rich, friable, easily worked, retains moisture to a wonderful degree, and wears well. There has never been a failure of crops, and the yield has always been most satisfactory. The usual amount of Wheat is twenty-five bushels per acre; Barley, sixty bushels; Oats, seventy bushels; Potatoes, five hundred bushels, and Hops, fifteen hundred to two thousand pounds per acre. Vegetables of all kinds grow in abundance, and Cabbages that weigh thirty pounds are not uncommon. Fruit, such as Peaches, Apples, of all kinds, Pears, Plums, Prunes, Cherries, Strawberries, Blackberries, Raspberries, Gooseberries, Currants, etc., is successfully grown in all parts of the county.

Good stock is raised in the county—Horses, Cattle, Sheep, and Hogs. They do not require feeding more than two months during any year, and many winters the weather is so equable that stock do not require any feeding other than that which they obtain on the range.

The area of the county, as before stated, is partly wooded and part prairie. The timber is composed of Fir, Ash, Cedar, Pine, Maple, Alder, and Oak. With this vast quantity of marketable timber, with the advantages of good

wagon roads, railroads, the river, and the outlet of the Pacific Ocean near at hand, lumber manufacturing is a profitable business. When the land upon which this timber is growing is cleared, it is excellent for agricultural purposes—better, if any difference, than the valley lands. The climate and excellent natural pasturage of this county greatly favor the pursuit of dairying. The cool summer nights, the abundance of pure cold water, and other favorable conditions render Butter and Cheese-making easy and profitable. The business is already carried on to a considerable extent. At present the supply is only about enough to meet the home demand. When farmers give more attention to this branch of industry they will find it more remunerative than so much Wheat-raising.

In this county are a large number of Sheep, and the Wool is of good quality. The fibre is strong, even, and free from burs, of fine texture, and brings a good price in the market.

The yield of Wheat ranges from fifteen to forty-five bushels to the acre. The grain is large and plump, and is deemed very ordinary in quality if a measured bushel does not weigh at least sixty pounds. The average Wheat when ground will yield from forty-two to forty-four pounds of flour. Oats often yield from sixty to seventy bushels to the acre, and a measured bushel will weigh thirty-nine to forty-two pounds. Tame grasses grow prolifically, Timothy being the principal grass used for Hay. Flax is grown in various parts of the county with success. It is more profitable at present than Wheat-growing.

ALBANY.

By Geo. W. Wright, President Albany Board of Trade.

This city is the county seat of Linn County, and is situated on the east bank of the Willamette River, fifty miles east from the sea, and about midway of the county, north and south. It has a population of five thousand. The Southern Pacific Railroad passes through Albany, north and south, and the Oregon Pacific from west to east. The latter road has its western terminus at Yaquina Bay, an inlet from the Pacific Ocean, into which enters steamers and other shipping which trade with San Francisco and other points.

A pleasant view greets the eye looking in any direction from the city, and within a radius of more than twenty miles is an agricultural country which cannot be surpassed for fertility and wealth in scarcely any part of the United States. Tributary to this circle are several streams radiating for miles into the Cascades and Coast Range of mountains. To the east of the Willamette are the North and South Santiam and the Calipooia; to the west, Mary's River, Soap Creek, and Luckiamute. All these streams flow through fertile valleys containing thousands of acres of rich soil, admirably adapted to farming, fruit orchards, and stock-raising.

The people of Albany are thoroughly alive, and imbued with the spirit of progress. The Albany Building Association has constructed a large and well-appointed opera-house. In 1888, a spacious and imposing school building was erected, occupying a whole block in the center of the city, at a cost of $20,000, exclusive of the land. In the same year a street-car line was built, encircling

the city and running cars from the depot to the principal business centers. An electric company was organized, and it has lighted the city and introduced the telephone, and has in contemplation the construction of an electric motor line. The same leading spirits have put into solid reality the proposed route to Astoria, at the mouth of the Columbia River, which now bids fair to become the terminal of one of the great southern trunk lines. A substantial wagon-road bridge has been built across the river at Albany, costing $10),000, and an appropriation of $25,000 has been made for the improvement of the streets. The Albany Iron Works is sending its output into the markets of Portland and the surrounding country. The furniture manufactories and the woolen and flouring mills are kept busy in supplying many of the surrounding cities with their products. The banking-houses, of which there are four, located in their own handsome buildings, are doing a safe and profitable business, deposits averaging $300,000 each, showing a healthy condition in earnings and surplus. The Farmers' and Mechanics' Insurance Company, a local enterprise, is doing a successful business. In real estate, no inflation of values has retarded the growth of the city, the market having been steady, giving no cause for relapse or stagnation of business. The city has a thoroughly-equipped fire department, composed of three companies, and is provided with an efficient police department. There are not less than ten church edifices of different denominations, and none with a vacant pulpit. The attendance at each is large, and they are well supported. The public school-building, as before stated, is a fine structure, with ten rooms and a basement; is heated and furnished after the most approved methods, and will accommodate five hundred pupils. School is kept open nine months in the year. It is a graded system, and is conducted at the expense of the State and County School Fund. The Albany Collegiate Institute, founded under the auspices of the Presbyterian Church, in 1867, is an institution of which the people of Albany are justly proud. A Catholic school is also located here, where an academical course may be obtained. This school was established some years ago. The building is commodious, and the grounds are neatly kept. The business street contains, among many substantial and well-arranged business blocks, an unusual proportion of elegant structures. Among these will be found the home of the Masons, Odd Fellows, Knights of Pythias, Workmen, and other charitable fraternities. On another street will be found the home of the Grand Army of the Republic and the Relief Corps, the halls of Albany Engine Company, No. 1, and Linn Engine Company, No. 2, and the spacious buildings of the county. Throughout the city are many handsome residences and cozy and home-like cottages, surrounded by lawns kept green by constant care and culture.

The importance of Albany as a center for railroad transportation and navigation must be recognized as second in the State. Besides the Southern Pacific and the Oregon Pacific, each of which passes through the city, there is the Southern Pacific East Side, which is crossed by the Oregon Pacific near the foothills on the eastern edge of the county. The Willamette River, on the western side of the city, is navigated during most of the year by the Oregon Pacific and Oregon Railway & Navigation Company's boats. The Oregon

Pacific is being extended eastward from Albany, and it is expected within a year to reach the eastern boundary of the State, and meet an Eastern line at Boise City, Idaho, thus forming another transcontinental route.

A system of drainage and sewerage has been adopted by the city which when carried to completion will be as nearly perfect as can be. Two large sewers have been constructed to the full extent of the city, and tributaries are in course of construction. These, when completed, will reach the most compactly built portions of the town and will afford ample and thorough drainage. Foremost among the factors which promote Albany's prosperity is her water power. A canal taps the Santiam River twelve miles southeast of Albany, and the topography of the country is so favorable for its construction that it is almost straight from the point of diversion to its terminus. Near Albany it is divided into two branches, one emptying into the Calapooia and the other into the Willamette. On the former there is a fall of thirty-two feet, and on the latter a fall of thirty-six feet. These branches are again divided and ramify the manufacturing portions of the city. The main canal is twenty feet wide on the bottom, with a fall of four feet to the mile, and the water is three feet deep. The flow of the canal furnishes a power of two hundred horse. Only a small proportion of this water power is used today, and should occasion ever demand it, the flow of the stream can easily be doubled, thus supplying the city of Albany a power which would run any desired number of factories.

LEBANON.

This thrifty town is located thirteen miles southeast of Albany, with which it is connected by a branch railroad of the Southern Pacific Company. It has a population of 1,250. Water power is used to operate flour, paper, and planing mills, a sash and door factory, and a furniture factory. The town contains a Presbyterian, Baptist, Cumberland Presbyterian, Methodist, and M. E. South Churches, a public school open nine months in the year, employing four teachers, an academy with three teachers, two libraries with four hundred volumes combined, an opera-house and hall, a fire department, a bank, and a weekly paper, *The Express*. There are Evangelical and Christian religious societies. The paper mill and equipment cost $100,000 and the school building $7,000, erected in 1890. The usual mercantile establishments found in a thriving town are doing well. Many elegant and cozy residences grace the town.

HARRISBURG.

This town is situated on the southwestern boundary of the county on the bank of the Willamette River, and contains a population of 600. It also contains many good business houses, a bank, and a weekly paper, *The Courier*. There are Baptist, Christian, Methodist, and Seventh Day Adventist Churches, a public school, roller flour mills, lumber mill, opera-house, water-works, and lodges of Odd Fellows and Masons. Odd Fellows' Hall, May & Snider's brick block, and the Christian and Methodist Churches are the principal buildings.

BROWNSVILLE.

This town is situated on the Woodburn-Springfield branch of the Southern Pacific Railroad Company, and on the Calapooia River, which affords good

water power. It is twenty-two miles southeast of Albany, and has a population of 850. There are operated here a large woolen mill, a flouring and planing mill, a tannery, and a steam sawmill. There are Baptist, Christian, Cumberland Presbyterian, Methodist, Methodist Episcopal South, and Presbyterian Churches, two schools with four teachers, water-works, a bank with a capital stock of $25,000, and a weekly newspaper, *The Times*. The school building, costing $6,000, is the principal edifice. It is a flourishing town in the center of a wealthy and beautiful country.

Halsey, Shedds, and Tangent are thriving towns on the railroad. Scio is a flourishing town near the foothills on the Woodburn-Springfield branch of the Southern Pacific Company, and near the Oregon Pacific.

The total valuation of all property in this county, returned for the purposes of taxation in 1891, was $10,226,168.

Malheur County.

This county was created in 1887, by cutting off the southern portion of what was then Baker. It is bounded on the north by Baker, on the south by Nevada, on the east by Idaho, and on the west by Grant County. It is about sixty miles wide, and one hundred and twenty miles long. Its principal streams are the Owyhee and Malheur Rivers. They are both large streams, the Malheur rising in the eastern portion of Grant County, while the Owyhee rises in Idaho, and swings round through Malheur County and empties into Snake River on the eastern border of the county. The surface is high, and the soil is generally dry. It is new, the settlements yet being sparse. There is an abundance of land yet open for settlement, but only a small portion fit for agriculture. The lands along the streams are fertile, and frequently spread into grassy valleys of considerable width. The stock ranges on the Malheur and Owyhee are the best in the county, and rank well up with the best in Eastern Oregon. But little rain falls in summer, and a small amount of snow in winter. Stock can live out the year round, except once in a great while. Time is required to develop the possibilities of this county. Much of the land is so dry that it must have irrigation to determine whether it will yield anything or not. However, it has been already demonstrated that water poured on to what had been blank desert, made it produce good hay and grain. Fortunately the streams are at a sufficient elevation, that when desired the water can be conveyed to almost any of the dry lands in the county.

While the raising of Horses and Cattle is the principal business of the people, still within the past two or three years more attention has been given to agriculture. Wheat, Oats, Barley, Timothy, and Alfalfa are the principal crops, and all yield abundantly. The markets of the mountain towns and mining camps here and in Idaho, adjoining, render agriculture lucrative. The county lacks settlement more than it does advantages. The latter are great enough to make it attractive That some idea may be gained as to the magnitude of the stock interests of this county, it is proper to state that near Ontario is established the largest Horse ranch in the United States. Great success has attended this company, and they have ten thousand Horses of improved breed-

ing. The Wool industry is of minor importance, and not so extensively followed as Horse- and Cattle-raising.

The Oregon Short Line, in connection with the Union Pacific, reaches Portland from Ontario. The Oregon Pacific proposes to build across this county from its present terminus at Yaquina Bay to a junction with the Short Line at Ontario.

Vale is the county seat, has a population of about 400, and is located eighteen miles west of Ontario.

The total value of all property in this county, returned for the purposes of taxation in 1891, was $1,314,709.

Marion County.

Marion County is bounded on the north by the Willamette River and Butte Creek, which separate it from Clackamas County; on the east by Clackamas County and the Cascade Mountains, which separate it from Wasco County; on the south by the Santiam River and the North Fork of the Santiam, separating it from Linn County; and on the west by the Willamette River.

The county lies on the eastern bank of the Willamette River, and extends eastward to the summit of the Cascade Mountains. The figure of the county is about an L in shape, having the southern and western lines nearly straight. The county is thirty-six miles across from north to south in the western or valley portion, and but twelve miles wide from the foothills east to the boundary or mountain summit. The rich agricultural portion is about thirty-six miles north and south, by say, fifteen miles east and west. Hardly as wide at the north, but a little wider at the south. The county contains, including valley, prairie, and mountain lands, about 900,000 acres.

There are two main divisions,—the mountain and the valley. The latter extends from the Willamette River to the foot of the Cascade Mountains, a distance of about fifteen miles. The northern part of the county does not extend to the mountains, as Butte Creek, the boundary line, runs nearly parallel to the mountain range for a distance of about fifteen miles from the place where it flows from the foothills.

The mountainous portion contains some fourteen townships of mostly unsurveyed land, lying in a strip twelve miles north and south by forty miles east and west, and comprises all classes of land, from rich narrow valleys in the passes, up through all the grades of rolling, hilly and broken, to that of rock-bound cañons and inaccessible craggy peaks. It is generally heavily timbered, and in the near future will be valuable for its lumber supplies.

The western portion of the county is comparatively level, and may be classed as good farming land, with few exceptions, and contains approximately about 450,000 acres. This tract embraces a great diversity in the character of the soil. For the most part it is productive. This variety of soil may be considered a desirable feature, as it enables the farmer to diversify his crop, and lengthens the period of seeding and harvesting more than would be practicable under ordinary conditions of uniformity of soil. Thus, the hilly and roll-

ing lands can be plowed almost any day in winter or early spring, and the seeding done before the level lands are dry enough to plow; then, later in the season, the rich bottom lands are plowed and seeded, thus giving ample time for getting the crop in, and extending the harvest time from July to October. This immense advantage being thus secured to the farmer by the variable soil and equable climate of Western Oregon.

Commencing at the north side of the county, we find the Willamette River, the boundary, the stream flowing to the east for twelve miles, when it leaves the county. Bordering the river is a low, rich, bottom land, varying from a half mile to a mile in width, made up of black alluvium, and divided between timber and prairie. Beyond the bottom the land rises in some places gradually, in others abruptly, some fifty feet, and extends for a distance of fifteen miles to the south in a level plain. There is generally a skirting of timber land on the edge of the plain from one to two miles in width; then it opens out into a low level prairie, known as French Prairie, which is some fifteen miles north and south, by seven or eight east and west. Twelve miles west of the northeast corner of this county, the Willamette makes a right angle and bears in almost a due course south for twenty-five miles, to the city of Salem. The first fifteen miles of this distance the river bottom, banks and timber skirting are similar to the twelve miles on the northern line. Pudding River and Butte Creek form the eastern boundary of the section above named, and timber land being about a mile wide, the greater portion of the timber on high land above the bed of the river. The river forks (Pudding) some ten miles above the mouth; Butte Creek bearing slightly to the east and Pudding River curving to the west. The land lying between the two streams for the first five miles is mostly timber. Thus it will be observed that the first fifteen-mile section of the county on the north is surrounded by water on three sides—the Willamette on the west and north, and the Pudding River on the east. The timber bordering on these streams affords an ample supply of fuel and lumber for all purposes, and that at a reasonable cost. The soil on French Prairie is a black loam and very productive. The brush and timber lands surrounding it are a clay loam, and wherever cleared and cropped have proven excellent Wheat and fruit lands. The prairie is very flat, and in consequence rather wet, but the water-courses on three sides furnish ready outlets for a complete system of drainage to the whole region whenever the enterprise of the husbandman sees proper to enter upon the work of draining the land.

The next section of the county extends ten miles further up the south to the city of Salem, and is about eight miles east and west. This portion is level and agreeably diversified with timber and prairie, in about the proportion of one to three. There are two or three small streams emptying into the Willamette from this section, but the soil is not so uniformly good as in the French Prairie, there being some black alluvium, some clay, and a small amount of gravelly land.

The portion of the county lying immediately east of the section last described is about six miles on the north, twelve miles on the south, and ten miles from north to south. It is cut by Pudding River near the western border, and Abiqua, Silver, Drift, and several other smaller streams run through the

eastern part, discharging into Pudding River. The land is made up of gently rolling hills and intervening valleys; here a beautiful prairie and there a grove of timber. On one slope of the hill will be found Fir and Hemlock, and on the other scattering Oaks, with an undergrowth of nutritious grass. The land is mostly red alluvium and extremely productive.

The remaining portion of the county lying south of Salem is divided into two parts by Mill Creek, which runs in the southern portion of the county, at the base of the Cascade Range, and flows diagonally across this section, emptying into the Willamette at Salem. The valley of Mill Creek varies in width from half a mile to three miles, and the greater portion of it is prairie land. A part of the valley proper is quite gravelly, though generally productive, while the low lands adjacent are very rich and among the most valuable in the county. To the east of Mill Creek Valley is a rolling country, known as the Waldo Hills, extending all the way to the mountains. These hills are gently sloping and dotted here and there with small groves of Oak-trees. Something more than half of this region is prairie land, but scattering Oaks are found all over the country. The division comprises about three and a half townships, and is bountifully supplied with water.

The remaining section, lying between Mill Creek and the Willamette and Santiam Rivers, is about evenly divided between rolling hills and level land. The level portions have black soil and the hilly part of a clay formation. Numerous creeks and overflowing springs afford pure water in abundance for all purposes. White Oak groves are common, and Fir and Cedar plentiful. Two thirds of the land is first rate and the balance divided between second and third rate. A small portion of the river bottom is gravelly, and a few of the higher ridges too dry and the soil too thin for productiveness.

One peculiar feature of the topography of the county is the range of hills commencing a few rods west of the village of Marion, and extending in a westerly course for seven or eight miles, where it unites and blends with the Salem Hills. This range is from three to five hundred feet high, and varies in width from half a mile to two miles. The land is red alluvium, well suited to wheat growing and fruit raising. On the north is a level prairie country, bordering Mill Creek; and on the south a level region, partially open land, and the remainder timbered with Oak and Fir. The greater part of the ridge is what Oregonians call "oak openings," scattering Oak-trees, with an undergrowth of grass and an occasional thicket of small Oak grubs. In some places small groves of evergreen trees are interspersed with the Oaks, making the landscape a very pleasing one. The land is generally strong and productive, and every year is growing in the estimation of farmers.

The Willamette River flowing on the west affords the means of cheap transportation at all stages of water. It has a width of about two hundred yards, and although there are numerous bars and rapids, it has been so improved that light draft steamers can now run at all stages of water.

The Santiam River, on the south, is navigable for a distance of ten miles from the Willamette River, up as far as the town of Jefferson. It is about three hundred and fifty feet wide as far up as the North Fork. The latter stream is about two hundred feet in width, and its course offers unequal facilities for water power.

Pudding River, on the north, rises in the foothills near the center of the county, and follows a northerly course to the Willamette River. It is from eighty to one hundred feet wide, and is a sluggish and exceedingly crooked stream.

Butte Creek is a beautiful mountain tributary of Pudding River, and fully compensates in its bounding, sparkling activity for the sluggishness of the parent stream. It takes its rise in the Cascade Mountains, well up towards the summit, and in its course passes through scenes of rare grandeur and picturesque beauty. In its practical utility, too, it is hardly surpassed, as it affords abundant water power, and is well stored with the speckled beauty of our mountain streams.

The principal remaining tributaries of Pudding River are Abiqua Creek, Silver Creek, and Drift Creek, and some few streams from the westward, unimportant, save as affording drainage and water for stock.

Mill Creek takes its rise in the hills near the southern boundary of the county, and flowing in a general northwesterly course empties into the Willamette River at Salem. The stream affords abundance of water power, and is a valuable aid to the industrial resources of Marion County.

Spring Creek takes its rise near the station of Marion, flowing westerly for about five miles, and empties into the Santiam.

The southwestern portion of the county is well watered by numerous brooks and springs, hardly a section of land being without the valuable adjunct of running water.

French Prairie, in the northern portion of the county, so called on account of its settlement by a number of Canadian ex-voyagers and employés of the Hudson Bay Company, is a level prairie about fifteen miles north and south, by seven or eight east and west, and is sufficiently timbered and well watered. The prairie soil is a rich black loam, and exceedingly productive. The timber lands consist of a clayey loam, and proving, when cleared, to be excellent fruit and Wheat soil. The land lies level, and is in consequence rather wet. There appears to be ample facilities for drainage afforded by the various watercourses on three sides of this fine stretch of land, should it be demed desirable.

Howell Prairie has become somewhat noted in the county as one of the best farming communities in the State. This beautiful prairie lies six miles northeast of Salem, and is seven miles long by three and a half miles wide, its general course being northeast and southwest. The land is gently rolling, soft, black alluvium. Large crops are the rule, and the lands command a ready sale at $30 an acre.

Santiam Prairie, in the southwestern part of the county, sometimes called the Santiam Bottoms, contains several thousand acres of rich bottom lands, and is the seat of a thriving and industrious population.

Salem Prairie, North and South Prairies, Crooked Finger, and many other openings dignified by local names, both in the valley and among the foothills, make up a sum total of several thousand acres of rich prairie lands, capable of producing cereals, vegetables and fruits.

The productiveness of the soil is marvelous to those who are accustomed to the small crops of the East. With good cultivation, forty bushels of Wheat

to the acre can be readily secured. The average, however, is about twenty bushels. Wheat is a great staple with the Oregon farmer, and its extra fine character has built up a splendid reputation for it wherever known. A large percentage of that grown is White Wheat, and the berry is large and plump, often weighing sixty-four pounds to the measured bushel. Our average Wheat will make forty-four pounds of extra No. 1 flour for a bushel of good Wheat.

Oats, Barley, Rye and the small grains do well, while vegetables are grown in great abundance. The nights in summer are too cold for Corn, yet it is raised in small quantities in every neighborhood. Fruits of all kinds that grow in the temperate zones are at home here, except the Peach, and in some localities there is no trouble in raising them. The German Prune does exceedingly well, and the small fruits and berries are generally abundant.

As a stock country, Marion County is good. Horses, Cattle, Sheep, and Swine are almost free from disease, and the mildness of the climate and productiveness of the soil render their raising a matter of comparatively little expense. Some attention has been given to the matter of improved breeds, and a few persons have introduced pure bloods, and the fine-stock interests will in future be more carefully guarded. In the matter of Sheep, we have some as fine pure bloods and grades as can be found anywhere, if practical tests are taken as the rule of judgment. French and Spanish Merinos have been largely introduced, and the Cotswald, Leicester, New Oxfordshire, and Shropshire breeds are found all over the county. Many of the breeders have crossed their flocks of Merinos with the long wools, and they get a yearly clip of from seven to nine pounds of long staple, long enough for combing purposes, as the average of their flocks.

Among the fine-blooded Cattle of the county are Shorthorns, Jerseys, Polled Angus, Guernseys and Holsteins. These different breeds of Sheep and Cattle are to be found in nearly every county of the State. Indeed, the question of fine breeding in all kinds of stock is receiving the attention of stock-raisers, and each year importations are made for the purpose of improvement. There are a great many Angora Goats in this county. They do well, and are profitable. So far as that is concerned, these Angoras will do well in any part of Western or Eastern Oregon, and if adopted by breeders and stock-raisers they would prove a profitable business. Very little attention has been given to breeding and raising Hogs in this county, and, for that matter, in the whole State. Dairying is pursued by a few on quite a large scale, and is successful. There are at present a few creameries in the southeastern part of the county. More of them should be established, as the grass is bountiful and nutritious, and the climate does not require shelter and extended feeding in the winter season.

The Southern Pacific Railroad enters the county on the south, at Jefferson, and runs north across it through the wealthy portion. The Oregonian Railway, a branch of the Southern Pacific, leaves the main line at Woodburn, in about the center of the county, taking an easterly and southerly direction through a rich section of country, passing through the towns of Mount Angel and Silverton, and within about two miles of Stayton, on to its present terminus, Springfield, Lane County, where it joins the main line of the Southern Pacific.

Land in the slope of the Cascades, in the eastern part of the county, is rich in timber forests which are contiguous to the Santiam River. The logs may be floated down the river to mills in the valley; but that is not necessary, for the reason that the Oregon Pacific Railroad is passing through this timber region, and will place the timber which may be manufactured there within reach of a good market. These forests reach to the very top of the Cascades, and comprise Red and Yellow Fir, Cedar, Pine, Maple, Ash, and other woods.

The rolling lands, improved, may be bought at from $10 to $25 per acre; the brush lands, where some improvement has been made, may be bought at from $6 to $20 an acre; brush and timber land, unimproved, may be had at from $4 to $15 per acre, according to its contiguity to railroad or river, and to the amount of timber on the land. The prairie or Waldo Hill land sells variously at from $15 to $100 an acre, according to the quality and amount of improvement. Persons with comparatively small means can do well in Marion County. In the foothills, immediately adjacent to the Cascades, is yet some land that may be had by taking up, at Government, school land, or railroad land prices. These lands require work to put them in shape to be profitable; but once the brush is slashed and burned the next spring the pasture is good, and in many places level land can be found to afford the farmer fields.

SALEM.

By H. W. Cottle, President of the Board of Trade.

The Willamette Valley in Western Oregon is fifty miles in width, by one hundred and fifty miles long. It is naturally the richest and most productive valley in the United States, growing all kinds of grain and nearly all varieties of fruit to perfection. The hills and mountains which surround this valley are covered with magnificient timber, and various minerals abound. Located in the heart and center of this valley is the city of Salem, the second city in population in the State. It is the Capital of the State of Oregon, and the county seat of Marion County. It now contains a population including the suburbs of about 15,000, and is growing very rapidly. It is a manufacturing and commercial city of importance, and is a noted social center. It is also the center of the fruit-growing industry of the Northwest, there being in active operation at this city, the largest fruit-canning establishment and fruit evaporater north of San Francisco. The district of which Salem is the center is also noted for the large number of fine Horses of various breeds which are produced there. The city is handsomely laid out with wide streets lined with beautiful shade trees. Its residences are surrounded with spacious lawns ornamented with trees and beautiful flowers. Pleasing styles of architecture are employed in the buildings, and whatever would add to the enjoyment of home life is observed in furnishing the surroundings of the homes of Salem families. The city is located upon the east bank of the Willamette River, a noble stream upon whose bosom steamers daily ply throughout the year, furnishing a free outlet to the ocean, low freights, and protects the people from all danger of railroad extortion. The city is also located on the Southern Pacific Railroad, and upon the line of two other projected roads which will undoubtedly be built in

the near future. The manufacturing interests of the city comprise two large flouring mills of a capacity of over 2,000 barrels per day, a large fruit-canning establishment, which during the past year put up about a million and a half cans of fruit and vegetables, a large fruit evaporater, a foundry and machine shop, two sash and door manufacturing establishments, a large sawmill, a large woolen-mill built two years ago which manufactures over 400,000 pounds of woolens per year. The city contains two electric street-car lines, having each over five miles of road. Salem is a city of State institutions, churches and schools. It contains fifteen church buildings, four large, fine looking public-school buildings, the building of two more contemplated in the near future, the Willamette University, the oldest protestant institution of learning upon the Pacific Coast, and one of the very best in the Northwest; the Sisters' Academy, which takes high rank as a Catholic educational institution, and has elegant buildings with beautiful grounds, the Capital City Business College, where a thorough business education can be acquired.

Salem is especially noted as being a healthy, moral city, and also a safe one. There has never been a boom at Salem. There has never been a failure of crops in the Wilamette Valley. Investments here are safe. Our people are safe. Business failures are almost unknown. The country is safe, as well as sure. It has never depended upon boom, but depends upon its own resources; in fact, were the Willamette Valley fenced off, and all communication severed from the rest of the world, there is probably no part of the world that would feel it less, for here is produced almost everything that man needs. Salem is a healthy place. The tenth United States census report shows that Oregon is the most healthy State in the Union. Salem is located in the most healthy part of the State. We have the best climate in the United States, when it is considered for the whole year through. The climate is here so mild that grass remains green during every day in the year. For the past two winters there has been no frost at Salem, no snow has fallen, and the rains at no time have been heavy enough to flood the streams bank full. The city possesses so many natural, commercial and political advantages that by no possibility can it ever retrograde, but must continue to be the metropolis of the richest agricultural valley of the new world.

The public schools are graded — complete system — and open ten months in the year. There is a splendid fire department, and a first-class system of water-works. The streets are now being paved and otherwise improved, at large expense. There is a fine steel wagon-road bridge here, connecting Marion and Polk Counties, built a year ago at a cost of $65,000. There are two national banks and two private banks, each doing a splendid business. Three newspapers are published — two dailies and one weekly. The State Insane Asylum is a modern institution, commodious and well appointed, located on an eminence two miles east of the city. The grounds are beautifully laid out, and kept in the very best condition. The asylum farm is spacious, well improved, and yields bountifully. The State Penitentiary, half a mile south of the asylum, is also a modern structure, with beautiful grounds, machine shops, all facilities for water power, guarding, and is supplied with ample farming land. The State Reform School is located four miles south of the

city, on the Southern Pacific Railroad. It has a large farm of fine land, well improved, and is supplied with all necessary buildings, modern, commodious, convenient, and comfortable. There is a school for the blind and one for the deaf and dumb, and an orphange, each of which receives State aid. The Capitol building is a magnificent structure. The Hall of the House and the Senate Chamber therein compare favorably with such rooms in any State in the Union.

Gervais is a flourishing little town on the Southern Pacific Railroad in the heart of French Prairie. It has a bank, a weekly newspaper, a good public school, and warehouses for storing grain for shipment.

Woodburn is situated on the Southern Pacific, and from this point branches off the Oregonian Railway. Here is the largest nursery in the State. It has a bank and a weekly newspaper, *The Woodburn Independent.* Woodburn is located in the center of a fertile and wealthy portion of Marion County. The railroad junction makes it full of business, and the town has grown wonderfully in the last two years.

Hubbard and Aurora are also on the railroad, both thrifty little towns. Aurora has a fine flouring mill, a splendid hotel, and a sawmill.

Butteville, Champoeg, and St. Paul are small towns, west from the Southern Pacific and on the Willamette River.

At St. Paul is located an excellent Catholic school for girls. At Mt. Angel, on the Oregonian Railway is located the school under the auspices of the Benedictine Fathers, a large and flourishing institution.

Silverton is also situated on the Oregonian Railway, and upon Silver Creek. This stream furnishes ample water power, which now propels a first-class flouring mill, a planing mill, a furniture factory, sawmills, and other machinery. Silverton has the advantage of a fertile and picturesque surrounding country, rich in agriculture and stock-raising. Very rich Coal mines have lately been opened in the Waldo Hills only a few miles southwest of Silverton.

Turner, eight miles south of Salem, on the Southern Pacific, is the site of a fine flouring mill and large warehouses for storing grain.

Marion and Jefferson are small towns on the Southern Pacific further south. The former is the seat of the Jefferson Institute, an educational institution of some note, and has a good flouring mill.

Aumsville is four miles east of Turner on the Oregonian Railway, and has an excellent flouring mill.

Stayton, a flourishing country town, is four miles southeast of Aumsville. Here is a larger flouring mill and first class sawmill, besides a sash and door factory. The power for driving this machinery is obtained from the Santiam River, which flows along the south boundary of the town.

Mehama, ten miles east of Stayton, located on the Santiam River, is a lovely little mountain village at the foot of the Cascade Mountains, and noted as a resort for health seekers during the hot summer months.

The total value of all property in this county, as returned for the purposes of taxation in 1891, was $12,325,107.

Morrow County.

Published in the Daily Oregonian for April 15, 1892.

It is not many years ago that Morrow County was known simply as a range for stock, everyone believing that to raise Wheat on the hills and Bunchgrass prairies was out of the question; but the last few years has demonstrated to the contrary, and a careful perusal of this article will so convince the reader. The county fronts on the Columbia River, and is crossed in the northern part by the Union Pacific Railroad. It is about thirty-five miles on the river, and extends to the south, with about the same average width, a distance of about seventy-five miles. It is bounded on the north by the Columbia River, on the south by Grant County, on the east by Umatilla, and on the west by Gilliam. Heppner is the county seat, so chosen at the election in June, 1886. The Union Pacific Railroad follows the windings of the Columbia, on the Oregon side, on its way to the metropolis, and within the county are the stations Coyote, Stokes, and Castle Rock. None of these are of as much importance to the county as those on the Heppner branch—Cecil, Douglas, Ione, Lexington, and Heppner. The branch of the Union Pacific mentioned was completed to Heppner on December 7, 1888. The branch leaves the main line at Willows and follows Willow Creek the entire length. The building of this branch to Heppner makes marketing of the products of the farmers less burdensome.

Southward from Castle Rock is a streak of sand and sagebrush running parallel with the river, and varying in width from four to eight miles. It presents a desolate appearance, yet stock seem to thrive on it, picking up a living by browsing on the sage and nibbling on the sparse grass tufts. Southward still, the gentle undulating surface of the country is covered with a rank growth of beautiful Bunchgrass. The soil looks light, and the considerable patches of it being placed under cultivation seem to give general satisfaction to the toilers who are reclaiming it from its wild state. Although there is room for many more, quite a few farmers have cast their lot on these Morrow County plains, and in Wheat-raisIng the average is about twenty-five bushels per acre from sand ground. As you recede from the river the soil darkens and becomes firmer, and its products surprise the old settlers who thought it would produce nothing but grass.

ALONG BUTTE CREEK.

Along Butte Creek and the eastern line of the county the general surface of the county is rough and broken. The bottoms along the creeks and cañons furnish a limited number of good ranches, where the soil is rich and deep; and the ranches shown along Butte Creek are mostly owned by old settlers, who are engaged in raising Horses, Cattle, and Sheep. The high hills surrounding these ranches are rough and broken, and unfit for farming, but furnish excellent bench grass pasturage. Further south you penetrate the tall timber of the western span of the Blue Mountains. The south end of the county is rich in timber resources, and no doubt also in undiscovered minerals.

Along about township four south, range twenty-five east, you strike the Rawdog or Yallerdog regions. This vicinity, sometimes called the Dairy

Ridge country, embraces a large body of farming land, and the soil being rich and black, and excellent crops being raised, many farms have been opened up and improved here during the past few years. The Allen road runs across from this vicinity toward Grant County, and a great deal of travel passes over this route.

The Eight-Mile region, further down the county, is cut in two by the intervening cañon of Dry Fork, in Gilliam County, the eastern portion being called Lower Eight-Mile. The Eight-Mile country may justly claim to have some of the best farming lands in Oregon, although there is but merely a local home market for the consumption of the products of the soil. On these and other ridgelands between Rhea and Willow Creeks is the cream of the county's farming land. No one ever thought of cultivating the hills until within the last few years, because there was plenty of rich bottom soil outdoors. Settlers who have commenced farming are men who, starting with small capital, are gradually building up and making their farms more valuable. They have a good climate and many other features to favor them, and with industry and perseverence are bound to come out all right in the end. The cream of the land is taken, but many places where good homes may be made may be open for the coming settler.

Morrow County is tolerably well watered by creeks and spring branches. Much of the best farming land is without running water, and in some localities wells have been sunk to considerable depths, while perhaps on the next section, on a more favorable slope, water is struck within fifteen feet of the surface. Every creek has along its banks a rank growth of Balm, Burch, Willow, and Hawthorne, but the bulk of the wood has to be hauled ten miles from the forests of the Blue Mountains. Many timber culture claims are being cultivated, and only for the repealing of the timber culture act the future would no doubt have seen the bald hills and plateaus furnish timber enough for all.

GOVERNMENT LANDS.

There is still a large area of land in Morrow County open to Government entry outside of railroad limits, which at present extends south from the Columbia forty miles, in which strip the odd sections are reserved to the railroad company, and the even sections cost, I think, $2.50 an acre. Many good claims may be bought at reasonable figures, and deeded and improved ranches may be bought at all the way from $5 to $50 per acre, according to location and amount of improvements. Real estate of all kinds is gradually and naturally increasing in value throughout the county.

To show more clearly the wealth of Morrow County, the following figures are taken from the assessment returns of 1891:

Description.	*Number.*	*Amount.*
Land, acres	176,905.69	$ 492,196
Horses	7,456	167,977
Cattle	7,775	86,099
Sheep		207,855
Swine	1,495	4,191
Gross property value		$ 2,088,308

The returns for 1892 show the school population to be 1,527, and the amount expended for maintaining the public schools during the year, $12,005.03.

The section of country on the north border of Morrow County, along the Columbia, which forms only a very small portion of the county, bids fair to soon give place to more important interests than mere grazing, for a company is already constructing a ditch from the Umatilla River to irrigate this entire rich basaltic belt, with the view of utilizing it for agricultural and fruit-raising purposes. When this is done as fine fruit can be raised on this sandy soil as in any other part of Oregon. Snow seldom remains long in this vicinity, and for all kinds of small fruits, Grapes, for instance, it could not be excelled, with sufficient water to make the vegetation grow.

There is, perhaps, no greater amount of Wool and Wheat shipped from any one county in the State than from Morrow, as the following will show: Two million three hundred and twenty-five thousand pounds of Wool were received by the M. C. L. & T. Co. in their warehouse in Heppner. Of this amount six hundred thousand pounds were graded and packed for direct Eastern shipment, the balance went to Oregon woolen mills and to Portland and San Francisco for sale. As a market Heppner maintained its established reputation as being the best place in which the grower can dispose of his product. Higher prices, on an average, are realized on sales in Heppner than have been received on consigned lots elsewhere.

The Wheat shipments from the different stations on the Heppner branch to date, including that which is in storage, is as follows: From Heppner, 93 cars; Lexington, 150; Ione, 231; Douglas, 253; total, 727 cars, which represents 436,200 bushels. The purchase of the mill company's wheat in storage along the line, and yet in the hands of the farmers, will increase the above figures to 600,000 bushels, the surplus salable. The average price paid was seventy-four cents per bushel, Wheat having ranged from sixty to eighty-five cents. At the average price the crop causes the disbursement of $444,000 among the farmers of Morrow County—nearly half a million dollars.

THE CITY OF HEPPNER.

Heppner being the county seat of Morrow County, is in consequence the largest town in the county. Its present population is estimated at 1,000, and each year marks an increase both in population and capital. All branches of business are well represented by young, live business men, and they are always ready to spend both time and money to the building up of their beautiful city. When the railroad was built to Heppner there was but one brick building in the city; now there are quite a number of beautiful brick business blocks. The number of fine dwellings are increasing yearly, while the population is being augmented by thrifty people.

The indebtedness of the town and county is small and taxes in consequence reasonable. The first house, a log cabin, was built in Heppner in 1872, just twenty years ago. The town commenced growing slowly from that date, but its greatest growth was about the time of the completion of the railroad into the town.

Heppner has a fine flouring mill; capacity, 100 barrels daily, and is run by water and steam.

It has also a plaining-mill which is a valuable adjunct to the town's prosperity ; has a complete system of graded schools ; a First National bank, with a capital stock of $50,000. The surplus and undivided profits have increased to $23,000.

The city is well represented in the matter of newspapers in the *Gazette* and *Record*, the former owned by the Patterson brothers, and the latter by A. J. Hicks. Heppner also has her building and loan association. This corporation owns the national bank building ; capital stock, $16,000. Its business is paying a dividend of 10 per cent.

The city is beautifully laid out with broad and well-cleaned streets, has good substantial sidewalks and is very attractive in its appearance. Beautiful shade and ornamental trees surround most of the finest residences, and at this season of the year, when they are putting on foliage, the sight is most gratifying. To say that the future prosperity of Heppner is assured, but feebly expresses it, and I trust by the next time I visit this city its population will more than double its present number.

MULTNOMAH COUNTY.

This county, located on each side of the Willamette River, is bounded on the south by Clackamas, on the east by Wasco, on the north by the Columbia River, and on the east by Washington. It fronts on the Columbia a distance of about forty miles, and about thirty miles along the Willamette. It is rolling and hilly, and covered with timber and undergrowth. Of course, the most of the county is under cultivation, and what is not is owned by private individuals, and held at prices ranging high. The farming community, being so near Portland, are engaged in gardening and fruit-growing, and many are engaged in dairying, to supply the city with milk. The soil is excellent, and is now producing nearly everything known to a temperate climate. Along the rivers is a large quantity of bottom land, which is very rich, well adapted to dairying or gardening, Hops or fruit. Domestic berries are cultivated extensively, and are profitable on account of the city market. Land in the margins of the county may yet be purchased, but any of it is not far from Portland, as the county is small.

PORTLAND.

By T. F. OSBORN, PRESIDENT CHAMBER OF COMMERCE.

Prior to the completion of the Northern Pacific Railway, in 1883, and other transcontinental railroads shortly after, the States of Oregon and Washington, generally known and spoken of as the Pacific Northwest, were more difficult to reach from the Atlantic seaboard than many of the provinces in the heart of Europe, and it is no doubt almost solely due to the fact of the completion of these railroads that the population of these two States has been increased from 249,800 in 1880 to 765,000 in 1890. Could this ratio of increase have obtained throughout the United States during the same period, we would in 1890 have had a nation of 150,000,000, instead of 62,654,000.

Although the boundary line between the States of Oregon and Washington

is by the Columbia River more sharply defined than the boundary lines between other States of the Union generally are, yet in all commercial interests they are so united as to render it difficult to consider the commercial welfare of either without including the other; to the State of Oregon, however, belongs the honor of possessing the city which controls the commercial and financial policies of the Pacific Northwest. Portland, Oregon, is to the Pacific Northwest what Chicago is to the country lying between the Alleghanies and the Mississippi.

Portland is situated on the Willamette River, twelve miles above the junction of that stream with the Columbia, and like nearly all the large cities of the world that are situated on navigable streams, lies at the head of navigation for deep-sea vessels.

It is not the purpose in this article to give a history of Portland from its earliest days, nor of the earnest endeavors that were made to build rival cities both higher up on the Willamette and lower down on the Columbia. Suffice it to say, the immutable law which seems to govern the locating of cities on streams navigable from the ocean at the head of navigation, enabled Portland to withstand all these attacks until she has seen them sink into oblivion and become efforts of the past. Situated at the entrance to the great Willamette Valley,—a valley, in comparison with others of the world's surface, that is rarely equalled, never excelled in its diversity of capabilities, and of sufficient extent to support a population of millions—she occupies a geographical position that is a key which has withstood the most earnest efforts of railroad corporations to thwart, and who, despite their utmost endeavors to make their termini elsewhere, have been forced by reason of Portland's position and commercial importance, for their own welfare, to continue their lines to her confines, until today she is the real termini of the three great transcontinental railroads—Southern Pacific, by way of California, and traversing Oregon's length from south to north; the Union Pacific, crossing the State east to west, and the Northern Pacific, which enters the State's boundaries thirty-eight miles north of Portland. In addition to these, by trackage arrangement between the companies, Portland has the advantage of both the Great Northern and Canadian Pacific Railways as additional transcontinental lines, and both of which are rapidly constructing their own roads to her borders.

These roads, which have their branches extending into all sections of the Pacific Northwest, furnish Portland's merchants not only with the means of bringing their merchandise into the city but also that of distributing their wares throughout the country; and in addition thereto, the city has transportation facilities over five local railroad lines into as many sections of the State. Situated as Portland is, within reach of vessels that traverse the sea, there may be seen lying at her docks during the year ships that have brought to her merchandise from every quarter of the globe, and receiving in return cargoes of Oregon's and Washington's golden grain for exportation to various European ports. In addition to the great number of vessels engaged in traffic to all points coastwise, north and south, and foreign ports, there are very many that are engaged in traffic on the various streams emptying into the Columbia and Willamette Rivers. All these have so firmly established Portland's position,

geographically, commercially, and financially, that there has ceased to be any argument with the railroad companies of how to establish any rival place; the effort has settled into the one purpose of how to get to Portland.

Prior to June, 1891, what now constitutes the city of Portland was under three municipal governments, Portland, East Portland, and Albina, comprising unitedly, according to the Government census of 1890, a population of 66,784. In June, 1891, however, the three were consolidated into one city, with somewhat increased boundaries, and having at the present time a population of something over 75,000 within its corporate limits of twenty-five and a quarter square miles. Portland, like the State of Oregon, generally is in a prosperous condition. During the year 1891 there were erected within her boundaries 2,134 buildings, valued at $6,647,465. The city is well provided with transportation facilities, having in operation eighty-seven and three fourths miles of street-car service. Portland, being not only the commercial metropolis of the State of Oregon, but the center from which the entire Pacific Northwest draws its financial aid, it is but proper, after having shown its naturally strong and unassailable competitive position, to submit some statistics of its business affairs resultant therefrom, and showing why it is considered "Rome" in the empire in which it is situated. According to its Chamber of Commerce records—

Portland's jobbing trade for 1891 was	$138,127,000 00
Real-estate transfers	10,944,759 90
Value of manufacturing output	30,854,608 00
Number of employés in factories	10,217 00
Banking facilities	$ 15,846,363 00
Number of banks	20
Clearing-house returns	$102,577,167 37

The following shows the number of houses engaged in business in Portland during the past three years, not including banks, with their approximate capital as estimated by R. G. Dunn & Co.'s Commercial Agency:

Amount of capital.	1891. *No.*	1890. *No.*	1889. *No.*
Under $20,000	1,182	835	307
From $20,000 to $40,000	85	61	59
From $40,000 to $75,000	52	47	42
From $75,000 to $125,000	35	30	24
From $125,000 to $200,000	21	18	17
From $200,000 to $300,000	13	13	13
From $300,000 to $500,000	18	14	13
From $500,000 to $750,000	7	8	8
From $750,000 to $1,000,000	3	3	3
Over $1,000,000	22	22	21
Unspecified	793	459	*
Totals	2,231	1,510	507

* Not reported.

The total capital represented by the above business houses is estimated to be at least $75,000,000 in 1891, against $70,000,000 in 1890, and 63,600,000 in 1889.

Tons of coal received, 1891	78,012 00
Value of exports, foreign	$ 8,293,720 00
Value of exports, coastwise	5,911,255 00
Total value of exports	$14,204,975 00
Value of imports, foreign merchandise, by sea	$ 1,298,221 00
Entries made at custom house	1,364 00

Registered tonnage inward and outward, Columbia River			918,912 00
Wheat shipped in 1891	Centals, 5,447,127.	Value	$ 8,100,020 00
Flour shipped in 1891	Barrels, 613,569.	Value	2,604,353 00
Postoffice receipts			211,743 78
Postoffice payments			97,312 73
Net income to Government			114,431 05

During 1891 there was received at Portland produce as follows:

Flour, barrels			531,642
Wheat, bushels			9,641,795
Oats, bushels			1,246,019
Barley, bushels			295,482
Flax seed, pounds			2,591,935
Hops, pounds			1,899,676
Wool, pounds			4,457,652
Hides, pounds			1,855,584
Potatoes, sacks			94,710
Green fruit, packages			273,196
Butter, packages			8,034
Eggs, packages			38,833
Mill stuff, tons			8,839
Salmon packed in 1891 (Columbia River and Southern Oregon), cases			439,650
Shipment of Salmon in 1891	Cases, 362,523.	Value	$ 1,818,250 00
Railway mileage in Oregon, Washington, and Northwestern Idaho, tributary to Portland in 1891			3,052
Public schools in Portland			24
Private schools			17
Churches			83

From the foregoing it will be seen that Portland's commercial reputation is based upon a record worthy of attention and consideration, and is one that has a direct influence not only upon the State but also upon the affairs of the entire Pacific Northwest.

Portland has its Chamber of Commerce, with a membership of five hundred and seventy-five of her business men, who as a body are broad in their views, recognizing that Portland is the metropolis to which the whole State looks. Matters of importance to any or all sections are treated in such manner as to endeavor to obtain a result for the greatest good to the greatest number, fully recognizing that what benefits the State benefits its metropolis, and vice versa. As a further proof of her conservativeness and reliability, it may be here stated that Portland has never had a failure of a wholesale business house, an unparalleled record for a city of her size. Like the entire State of Oregon, she has never been visited by a boom, consequently has never suffered from the depressing influences resulting therefrom. Oregon's growth is conservative, reliable, real, safe, sure.

Polk County.

This county is bounded on the north by Yamhill, on the east by the Willamette River, on the south by Benton, and on the west by Tillamook. It has an area of about eight hundred square miles, and its topography is prairie, hill, rolling, and mountain. The soil of the hills is usually of a reddish color, and is said to be the best of Wheat land; the Wheat grown in this soil is pronounced to be the richest in flour. The soil of the prairie is a rich, dark loam; is very productive in all the cereals. The soil in the hill lands is fertile. Decayed vegetable matter in proper condition is, as everybody knows, a most valuable fertilizer. In the foothills or slopes of the mountains of Polk County the decomposition of mineral and vegetable substances goes on with equal steps. From this source a large part of the soil is derived. Formerly it

was thought that the bottom lands of streams must be more fertile than the uplands, to whose loss the former are indebted for their fertility. That this supposition is untrue it is only necessary to examine the relative productiveness of the Eola hills with low or prairie lands. The latter gain in comparison only as regards ease of tillage and immediate adaptability to a crop. In fertility, endurance, and certainty of a crop the hill soils, in selected localities, are found to be superior to most bottom lands. All the bottom lands are made up of the washings from the hills added to the clays and loams from other sources. A farm of red hill land near Eola, in this county, was tilled for fifteen and even nineteen years, and raised crops usually exceeding thirty bushels of Wheat per acre, without the addition of any fertilizer and without the least impairment of the soil. The soil in the foothills, we may conclude from circumstances, is inexhaustible in fertility. In the hills back of Dallas, farms have been cleared and show this unfailing productiveness. The foregoing will apply to all the hill lands in the Willamette Valley.

The Coast Range, bounding Polk County on the west, is peculiarly adapted to stock-raising. The soil is fertile and produces nutritious grasses, upon which cattle range and fatten the year round. Many of the farmers, for winter range, drive their stock to these mountains, where they thrive without further care. Sheep husbandry is one of the most valuable industries of the county, and is confined principally to the ranges nearest the mountains on account of the variety of native grasses upon which sheep thrive best.

Polk County is peculiarly adapted to dairying on account of its ample supply of native grasses, its equable climate, and pure water. At present the attention which this industry deserves is not given to it, further than to manufacture enough Butter and Cheese to supply the immediate home demand. There is a creamery five miles west of Dallas using the milk of two hundred Cows, and if there were many more sufficient to create a demand, farmers would soon provide themselves with enough Cows to readily supply it. The grades of Cattle are improving constantly, and this county now owns some of the best milk stock in the State or in the United States.

There are several large and busy flouring mills and numerous sawmills in all parts of the county. Wheat is the staple agricultural product, and the Coast Range here, as in other counties, supplies a large field of fine timber for manufacture, comprising Fir, Cedar, Spruce, and Hemlock. Fruits of all kinds are grown in all parts of the county, attaining a high degree of excellence in point of development and flavor. All kinds of berries are grown, and produce abundantly. Oats yield largely, and Barley is a profitable crop. Hops are extensively grown, and have proved a remunerative industry; this crop is confined to the rich and extensive river bottoms, which yield from 1,000 to 2,000 pounds per acre. Vegetables of all kinds are raised, and of excellent quality. La Creole, Luckiamute, and Mill Creek are the principal streams, each furnishing ample water power for manufacturing purposes.

The Southern Pacific Railroad passes through the county north and south, from Portland to Corvallis, and a narrow-gauge railroad from Portland crosses the Southern Pacific and traverses the county, with its terminus at Airlie. The Willamette River is navigable, along the eastern boundary of the county, during the entire year.

Dallas is the county seat, is located in the center of the county, on La Creole, and has a population of thirteen hundred. The creek furnishes water power for a flouring mill, sash and door factory, foundry, electric-light works, and sawmill. It is provided with a good volunteer fire department, has wide, commodious streets, and presents a handsome appearance. It has two public-school buildings, employing five teachers, an academy, and two weekly newspapers—the *Itemizer* and the *Observer*. Its churches are Methodist, Methodist Episcopal South, Baptist, Presbyterian, Christian, and Mennonite. Has lodges of Odd Fellows, Masons, Ancient Order United Workmen, and a Grand Army of the Republic Post. The chief buildings are the academy, Odd Fellow's Hall, Enterprise Hotel, and Methodist Church. There are several flourishing mercantile establishments, and the shipments are grain, flour, hops, leather, fruit, and other produce. A tramway four and one half miles long, to bring logs and lumber from the hills, has lately been constructed at a cost of $15,000.

INDEPENDENCE.

By J. S. Cooper.

The subject of this sketch is a beautiful town of about 2,000 inhabitants, situated on the west bank of the Willamette River, about sixty miles south of Portland. Being on the line of the Southern Pacific, together with the advantage of river transportation, and being within two miles of Monmouth, the location of the State Normal School, which has an attendance of nearly four hundred students, through which place the narrow-gauge railroad passes, and being connected thereto by one of the best equipped motor lines in Oregon, give it advantages as a commercial center that no other town on the west side enjoys. Its business men are wide awake and progressive, and today are in possession of nearly all the modern improvements that would do honor to larger cities, a few of which might be mentioned: a fine electric-light plant, an excellent water system, together with sawmills, gristmills, sash and door factories; with every line of business well represented, there being two National Banks, four general stores, with grocery stores, drug stores, etc., the list being too long to enumerate, but suffice it to say it is known as one of the best business towns of the valley. It is surrounded by one of the best agricultural countries in the valley, the soil being adapted to the growth of grain, fruit, vegetables, grasses, and hops.

The resources of the surrounding country are vast and comparatively undeveloped, and with her most excellent shipping facilities, together with the rapid growth of the country adjacent, Independence will, no doubt, make rapid strides in the near future, and will continue to hold a place in the front rank of the towns of the Willamette Valley. There is now a growing sentiment among the farmers to cut up their large tracts of land, and much of this will soon be done, largely increasing our population and giving what the country needs—a variety of products. All the land between this place and Monmouth being now platted and changing hands and being improved will soon unite our interests and make the two towns as one. This event would give us a strong impetus, and make Independence the best town south of Portland on the west side of the Willamette.

Dixie is a lively little town on the bank of La Creole, and within half a mile of the Southern Pacific Company's Railway, all trains of which stop at its station, Derry. Here is a fine roller-process flouring mill, with a capacity of seventy-five barrels per day.

Airlie, Ballston, Eola, Lewisville, Lincoln, McCoy, Perrydale, Suver, all good trading points, go to make up the balance of Polk County's rising young towns.

The value of all property in this county returned for the purposes of taxation in 1891 was $5,918,605.

Sherman County.

By G. W. Ingalls.

Sherman County was a part of Wasco County until February, 1889. It is bounded on the north by the Columbia River, on the east by the John Day River, on the west by the Des Chutes River, and on the south by the eastern portion of Wasco County, making an average width of about twenty-five miles and a length of fifty miles.

Its characteristics of soil and products are identical with those of Wasco County, with the exception of timber, and depends chiefly on the latter for that. Less than twelve years since the whole country from the Columbia River to the southern boundary line was one vast stock range, covered with waving Bunchgrass and immense herds of Horses, Cattle, and Sheep. Now the country is one vast grain field, either in crop or summer-fallow, and as viewed from some advantageous hilltop, presents a magnificent mosaic of green and red. The farmers of this county are a remarkably intelligent, sober, and prosperous people. The fine crops of last year, with the good prices for grain, placed most of them in easy circumstances. The great need is railroad connection with the head of navigation on the Columbia River and the Union Pacific Railway system, which traverses the entire northern boundary of the county. Grain-raising here is conducted on a large scale. He is a small farmer who has not as much as 200 or 300 acres of Wheat.

The writer of this article is indebted to Hugh Gourlay of *The Dalles Chronicle* for the following statistics on farming: Smith Brothers have 4,500 acres under improvement and will summer-fallow 3,500 acres this year; G. D. Woodworth has 1,600 acres under improvement, and this year it is nearly all in summer-fallow; Medler Brothers have 1,200 acres improved; Hilderbrand & Hanson, 1,200 acres; B. F. and John Medler, 1,000 acres each; McDermott Brothers, 1,120 acres each; Sink & Sons, 2,000 acres; Dunne Brothers, 1,200 acres; Dell Porter, 1,120 acres; Murchie Brothers, 1,760 acres; Mrs. J. McPherson, 1,000 acres; J. H. Stocking, 1,000 acres; Froebe Brothers, 1,600 acres; J. E. Forbis, 960 acres; Sexton Brothers, 960 acres; J. McMillan and A. D. McDonald, 900 acres each, and several others have 640 each. The average crop of Wheat of this county is about fifteen bushels per acre, and the average Sherman County farmer has exported 2,000 bushels of grain. There are 1,333,338 acres of the land of this county in cultivation, and there are thousands of acres of good land in the county which can be purchased at very reasonable figures,

offering flattering inducements to those people who desire to escape from the rigorous winters of the East and secure homes in a climate that has proved a sanitarium for hundreds affected with pulmonary and asthmatic troubles.

The county seat is Moro, with a population of 300, and has a Baptist and Methodist Church, two hotels, three stores, one newspaper, and a fine new school building.

Wasco has a population of 300, with four stores, two hotels, a Christian, Methodist, and Baptist Church, a good graded school with fine school house, a fraternal hall, and a Masonic, Knights of Pythias, and Odd Fellows organizations.

Grants, situated on the Union Pacific Railroad, has a population of 200; has one general store, foundry and machine shop, a distillery, with fifty-barrel roller-process mill attached.

Grass Valley (Postoffice) has two large stores, one hotel, and considerable business is done here. There is one old-style grist-mill located on the John Day River. There are postoffices, schools, and small settlements at Rufus, Biggs, Fultonville, Monkland, Erskineville, Kent, Badger, and Rutledge. The southeast part of Sherman County is well watered, and adapted to raising Cattle, Horses and Sheep. There is a limited amount of the very choicest fruit land along the Columbia River in this county, and the orchards have established a reputation for the choicest character of fruits, and, like those of Wasco County, are in the market fully two weeks earlier than other sections of Oregon. A daily line of stages connects Grants on the Union Pacific Railroad with most of the towns of the county.

Number of school districts in the county, all with good school-houses, 29; number of Horses, 4,764; Cattle, 4,793; Sheep, 38,712. There is but one saloon in the county, and that is at Grants, on the railroad. There is great need of a railroad from the river to the southern portion of the county, and when built property will appreciate in value fully one hundred per cent.

TILLAMOOK COUNTY.

Tillamook is one of the wealthiest counties in undeveloped resources of Oregon. It has a sea coast of over sixty miles, adjoining Clatsop on the north and Benton on the south. It contains six different streams discharging directly into the Pacific Ocean, one of them being the best harbored river naturally between the Columbia River and the Golden Gate. We will enumerate them in the order of their respective agricultural and commercial importance.

First, Tillamook Bay has an average of sixteen feet of water at high tide during the entire year. There are times of the year during heavy rainy seasons when there is more. This bay is about eight miles wide by twelve miles long, and has five different rivers flowing into it, viz: Miami, Kilohes, and Wilson Rivers on the north side, and the Trask and Tillamook Rivers at the head of the bay. Each of these rivers flow through a rich timber country, furnishing a large amount of bottom land suitable for agricultural, and better for dairy and stock farms on a small scale. The soil is as rich as any that can be found, and will produce any kind of vegetables and grass in abundance.

From thirty to fifty acres cultivated will support any family, as the soil will never wear out. These remarks are applicable to all the water courses that head in the Coast Range, each river having its peculiar advantages, and all of the above being worthy of mention here.

The Miami River affords a natural pass into the Nehalem River Valley, passing through Foely Valley, which is now being settled up, though plenty of good land yet awaits the settler to come.

Kilohes River is of less importance than the above, but affords more bottom land for agriculture. Some of the earliest settlers located here as far back as 1851, when half of the Willamette Valley was lying idle and nearly all of Eastern Oregon untouched.

Wilson River is a stream of great importance. It was named for the honable ex-member of the Legislature who served when Hon. L. F. Grover was elected to the United States Senate. Along its banks is a large amount of idle bottom land fit for agriculture, and an immense amount of valuable timber throughout its entire length. This river also forms a natural pass from Tillamook to Washington County in the Willamette Valley, and a road must be built there before long.

Trask River is the least valuable for agriculture, but possesses untold value in timber. Any one crossing the present road, and the only one now leading from Tillamook to North Yamhill, will at once exclaim: "This is the finest timber land I ever saw!" Trees one hundred and sixty feet high, as straight as an arrow, and enough of them to furnish millions of feet of logs for lumber! The land is yet unsurveyed, hence not now available. Once obtainable, millions of dollars will be invested and fortunes correspondingly large will be made. The timber now can be floated in this stream only in the winter, but capital will improve it so it can be used at most any time for a distance of twenty-five to thirty miles from its mouth. By this means the timber may be brought to Tillamook Bay, and thence to the markets of the world.

Tillamook River passes through a comparatively flat, low country. It has more farming land than any of those streams mentioned. It heads against the waters of the Nestucca, forming a natural outlet, and indeed a very good pass to Sheridan, in Yamhill County, by way of Grand Ronde Indian Reservation.

Tillamook County produces mostly Butter, stock, Beef Cattle, and a very few Sheep. The bay furnishes fish, principally Salmon, and several different species of clams, available nearly all the year round. In the fall of the year the bay furnishes fine hunting, Ducks and Geese being plentiful. All the streams afford fine Trout in season. Game in the mountains, however, is growing very scarce.

A Cheese factory and creamery are very much needed, so that Butter and Cheese may be manufactured of a uniform standard, which, individually, it is impossible to attain. As has already been intimated, Salmon are canned and shipped to the markets of the world. Lumber must in time, and will overshadow all other resources combined, for the county is immensely rich in timber products.

Netarts Bay is situated ten miles south of Tillamook Bay, and is very much like it. This bay is surrounded by heavy timber, rendering the bottom lands difficult of cultivation. Immediately adjoining the bay, are very rich tide lands, which, when dyked, will be productive and of great value. This bay formerly furnished Oysters, and vessels came directly here from San Francisco to get them, but for want of sufficient quantities to pay for regular shipments, the business was abandoned years ago.

Nestucca River is situated twenty-two miles south of Tillamook Bay. It has a very unreliable entrance, hence, so far, has been but partially developed. The water on the bar is not of sufficient depth to admit the passage of any craft that is suitable to navigate the ocean; therefore, commerce by water from this point is very limited. The portion of Tillamook County drained by the Nestucca has a very good mountain road, available nine months in the year for travel to and from Sheridan, in Yamhill County, and during every summer great numbers of people pass through here to visit the sea shore. By the way of the Grand Ronde Reservation, one can with ease reach the mouth of Nestucca River from Sheridan in a day. The river itself divides four miles above its mouth the branches called respectively Little and Big Nestucca. The Big Nestucca takes a northerly course, heading with some of its branches against the head waters of Tillamook River. This river has fine bottom lands, none finer to be found anywhere, principally occupied, but very poorly improved. Little Nestucca heads against the head waters of the South Yamhill River, affording as mentioned above a very good outlet, through which is a road largely traveled in the summer. The resources of the Nestucca, both branches and main stream, are farming, principally Butter-making and raising Cattle and Sheep. A large portion of the country along this river is open, the timber having been destroyed by fire in 1868. Bee-raising is destined to become an important industry, requiring a small capital and little labor to produce satisfactory results. The Bees feed on the wild flowers growing on the bald mountains, and no better honey is produced anywhere. In this section no town of importance has as yet been built, the settlers being too few and far apart. In time a town must spring up at the mouth of the bay (Nestucca), the foundation of which has been laid this summer by the building of an extensive Salmon cannery, named Carmathen Port, after an English vessel which was wrecked immediately in front of it on the second of December, 1886. A store and a sawmill will now be built, and thus permanently establish the business of this section at this point. It is beautifully situated and has natural advantages not otherwise found. The name of its postoffice is Oretown, at which point is a single hotel, which is most efficiently kept.

Salmon River, situated seven miles below Nestucca, is a mountain stream heading against the Yamhill. The land is at present unsettled, as it belongs to an Indian Reservation.

Siletz River, situated twelve miles south, is in the same condition—an Indian Reservation. The land along both of these rivers, once declared open for settlement, will afford homes for thousands.

Nehalem River is situated eight miles north of Tillamook Bay, but has no entrance suitable for anything like commercial facilities. Its resources, follow-

ing up into Clatsop County, are unsurpassed. We believe this stream drains more valuable timber land than any other stream does on the Pacific Slope, and its value cannot be overestimated. It discharges itself through sands and shifts continually from place to place, varying as much as half a mile in one year. A railroad connecting this portion of Tillamook County with the Columbia River at Astoria, will in time be constructed, and will open an immense business in Lumber, and in Coal and Iron. Coal is here found in large veins, but remains undeveloped for want of transportation facilities. We predict a grand future for Nehalem. Once it is opened, its resources are almost inestimable. This river heads back of St. Helens, in Columbia County, and against the head waters of Gales Creek, which crosses Washington County.

A person can establish himself comfortably in this county on a farm of say one hundred acres, partly under cultivation, for fifteen hundred dollars; if he takes Government land, for much less. In 1886 there were put up in this county three thousand cases and one thousand barrels of Salmon. Improved lands are for sale at from five to ten dollars per acre, while some cannot be purchased short of twenty dollars to forty dollars per acre. All kinds of small fruit and berries flourish. The principal business of the agricultural portion of the people is Butter-making. There is yet a large amount of vacant school land, besides vacant Government land, a larger portion of which is adapted to grazing and agriculture.

Tillamook is the county seat, and has a population of 800. It is located on Hoquarton Slough, at the head of Tillamook Bay. It is a thriving town, contains a Methodist, Catholic, and a Christian Church, a fine school-house with three teachers, a court-house, an ample public hall, lodges of Masons, Odd Fellows, and A. O. U. W. It has an efficient volunteer fire department, good water-works, and a weekly newspaper. Steamers sail direct from here to San Francisco and Portland and other other points.

Bay City, Hobsonville, Netarts, Garibaldi, Woods, Oretown, Dolph, and Nehalem are small towns in the county, building thriftily and promising well.

The total value of property in this county, returned for the purposes of taxation in 1891, was $1,335,348.

UMATILLA COUNTY.

HOLIDAY EDITION OF EAST OREGONIAN, 1891-92.

Umatilla County is situated in the northeastern portion of the State of Oregon, between 45 and 46 north latitude and 41 and 42½ west longitude from Washington. But one county—Union—lies between it and the eastern boundary of the State, and its northern boundary is the northern boundary of the State, being surrounded on the north by the Columbia River and Washington State, on the east by Union County, on the south by Grant County, and on the west by Morrow County. In round numbers it contains about ninety townships, or about 2,073,600 acres. Some of the county is mountainous, such as that which includes the territory traversed by the Blue Mountains, which are in the eastern and southern portions of the county. There is also along the northern edge of the county, on the Columbia River, a strip of sandy land, which would require

irrigation to adapt it to agriculture. These lands, comprising probably twenty-five townships in all, are not sought for the purposes of agriculture, though most of them are used as range for stock. After deducting these, the remainder, about sixty-five townships, is fine agricultural land and a large proportion of it of extraordinary fertility, and which can scarcely be equaled, and certainly not surpassed anywhere in the United States. Thus, the lands of the county may be comprised under three heads: mountain, sandy land, and agricultural land. The mountainous portion of the county is valuable, for besides being used for grazing purposes, it supplies timber for building, fencing, and fuel, and in many parts, when cleared, grows Timothy to perfection; in fact, Timothy grows wild in many places on the mountains. Within this mountain district there are probably over 500,000 Sheep kept and grazed every year. In this mountain range sawmills are located, and manufacture Lumber and Shingles, they being shipped and hauled to the prairies, together with quantities of fencing material and fire wood. These mountains can, in most every direction, be traversed by Horse, and in many directions by wagon and team. Nor is the strip along the Columbia River worthless. It is sandy land covered with sagebrush, but produces an early, fine grass, very nutritious, affording pasturage to many Cattle and other stock. It is when cultivated and irrigated well adapted to the production of cereals, especially Wheat. Between the boundaries of the rugged foothills and the belt of sandy lands lies the great grain-producing portion of the county, nearly 1,500,000 acres. Along the mountains the agricultural lands are considerably broken and rough, and bordering upon the sandy region, the soil is lighter than elsewhere, and more subject to drouth, and therefore, not so productive as that which lies farther back.

Passing over those portions touched upon above, Umatilla County may be described generally as an elevated, rolling plain or plateau. Such would be its appearance from a distant bird's-eye view. On closer acquaintance, however it is found considerably broken, and indented with numerous small cañons or gulches, mostly dry, except when melting snows convert them into temporary stream-beds.

Here, then, is the southwestern portion of the great Columbia Basin. Between the wooded hills and the great river of the Northwest lies this fair and fertile land, the soil and climate of which have attracted so many already who have turned their steps hitherward. The soil is indeed a wonder to all strangers, and it is difficult for them to believe at first that the land of such appearance as this is capable of raising anything, much less such wonderful crops as are really grown. In a part of the country, it is true, the soil when moist presents a dark, rich appearance, and this is really the best; but further from the mountains, where it looks lighter and is looser and finer, it is scarcely less productive. In summer, when no rain has fallen for several weeks perhaps, it is so dry on the surface, so light and parched in appearance, that a stranger unacquainted with its qualities, would at once pronounce it utterly useless. But he need only wait till harvest for abundant proof of the maxim that "appearances are deceptive." One marked feature of this soil is its capacity to retain moisture, so that when after some weeks without rain the surface

seems parched with drouth, the soil a few inches below will be damp, and grain will be found growing green and rank, and later, ripening into a bountiful harvest, when, under similar climatic conditions in many localities, any plants would have starved for lack of water. The prairies of Umatilla County are not so well watered as might be desired, yet there are a number of small streams, and no locality is far from these. The principal streams are the Walla Walla and Umatilla Rivers, and Wild Horse, Birch, Butter, and other creeks. On the uplands abundant springs are also frequently found. The streams are bordered by a growth of Cottonwood or Balm, and other trees supplying fuel and fencing material. Most of the settlers upon the prairies have to depend on the mountains for their wood, hauling it a distance of from five to forty miles. The timber of the Blue Mountains is mostly of Pine and Tamarack.

The leading occupations of the citizens of Umatilla County are stock-raising, Wool-growing, dairying, and farming. At first, when the county was sparsely settled, stock-raising, including Wool-growing, were the principal pursuits. A luxuriant growth of Bunchgrass covered the plains, upon which stock would thrive and fatten without other food, and thus the stockman felt that he had found his paradise. It was to his interest to discourage all cultivation of the land, and in pursuing this course he produced the belief, which prevailed for some years, that the land was not adapted to agriculture. Attempts were, however, made to disprove this, and beginning in the northwestern portion of the county, the plow has advanced with most gratifying results, pushing its way gradually but persistently southward and westward until the area left to flocks and herds has been greatly diminished. Much to the surprise of the old settlers, the uplands were found to be even more productive than the small creek bottoms, and it seems that where the depth of soil is sufficient, the higher the land the larger and better the crops. Thus agriculture has made such steady advances that Wheat-raising has now become the leading industry of the county, and since 1885 the Wheat export from this county has varied from about two and one half to four millions of bushels annually, and now that the Northern Pacific's forfeited railroad lands have been restored to the people, and a large portion of the Umatilla Reservation lands have been thrown open to settlement, the amount will doubtless be largely increased. In the section of the county best adapted to Wheat-growing the yield is sometimes very large, many farms or ranches yielding as high as from forty to fifty bushels to the acre, and some few favored tracts have yielded as much as seventy bushels to the acre; but the average, in the desirable portion of the Wheat belt, is probably from thirty to thirty-five bushels to the acre. In other portions of the county the average yield sometimes is as low as from ten to fifteen bushels to the acre. With the improved machinery and methods of cultivation crops can be raised and harvested at much less expense than in the Eastern States, and farmers therefore find a good profit in raising Wheat at fifty cents a bushel. Besides Wheat, large crops of Barley, Oats, and Rye are raised, and some Corn, though little attention is devoted to the latter. Vegetables are astonishingly thrifty, and are raised with little effort in nearly all parts of the county. Portions of the county are especially adapted to fruit-

raising, and almost in any part the hardier varieties thrive. In the northeastern portion, especially in the vicinity of Milton, fruit is grown with great success and profit. In this favored Milton Valley, there are yet good opportunities for hundreds of others to secure tracts of fruit land, and by pursuing fruit-raising can insure a large income to themselves, with less hard work than by raising grain. Next in importance to grain is Wool, with an annual yield of between one and one half and two million pounds, the average yield being from eight to ten pounds to the Sheep, and is usually sold at prices ranging from fourteen to eighteen cents a pound, making probably a total income to the county of about $300,000 annually. In addition, thousands of Sheep are annually sold, making the income from Sheep and Wool probably $500,000.

Other stock, Horses and Cattle, are raised in large quantities for export. In former years, before any amount of farming was done, a larger number of stock was raised upon the range, without preparing any feed for the winter, and there was comparatively little loss consequent upon this; but since the range has been decreased by the encroachments of the farmer, in later years, it has been found advisable to prepare feed for one or two months during the winter, in order not to hazard any serious losses.

That part of the county known as Camas Precinct seems specially adapted to dairying. It is a beautiful country, with a succession of mountain valleys, with rich soil and very productive, and besides its ample ranges of wild grass, tame grass and small grain are raised in quantities more than sufficient to supply the local demand. Here quite a considerable amount of Butter and Cheese are made for the Pendleton market. Besides this section, many of the fine ranches along the Umatilla, Birch Creek, Wild Horse, and other streams are adapted to dairying purposes. The demand largely exceeds the supply furnished by this county, and much of the Butter and Cheese consumed here are imported. Butter sells readily all the year round at from thirty to thirty-five cents a pound, and Cheese at about sixteen cents.

The mineral resources of the county, though considerable, have not been developed to any great extent. The precious metals are, however, found in the extreme southeastern portion of the county, and it is thought that some of the mining claims in this county, as well as the neighboring mines of Baker and Grant Counties, will prove very rich when capital sufficient is interested to develop them. There are large deposits of Coal also, especially in the southern portions of the county, near the head of Butter Creek, which promise to be of great value. These are altogether owned by local parties. Some of the Coal has been used in Pendleton as a test, and found to be of fine quality. The opening and working of a Coal mine not far from Pendleton would be of incalculable advantage to the place, besides proving most remunative to those who might invest.

The county is well supplied with churches and schools. The conduct of the schools has been in efficient hands, and the laws governing them have been liberal and wise, ample provision having been made for their maintenance and support, their standard therefore being continually advanced. The State has a large irreducible school land fund, and there is a general county tax of five mills additional. The common schools in the county number between eighty

and ninety, five of which are graded schools. Besides these there is a normal school at Weston, an academy at Milton, and an academy and Catholic girls' school at Pendleton, and several private schools. Quite a number of churches, representing as many religious denominations, are to be found in the county, especially in the towns, and where they are not found, the school-houses are used for religious worship.

The population of this county in 1890 was about 16,000, which we think has been much augmented since the census was taken, occasioned by the opening up of new farms on the Northern Pacific forfeited railroad lands, and lands of the Umatilla Indian Reservation, both of which were thrown open to settlement during the year 1891. The throwing open of these lands to private owners has probably resulted in adding 400,000 acres to the taxable property of Umatilla County, which has already had the effect to reduce taxation. The population comprises men of all nationalities, and immigrants from all States; but the greater portion are native Americans from the Western States, who, as a rule, are intelligent, enterprising, industrious, and thrifty, than whom a better class of people can scarcely be found in any State.

We seldom have any severe cold until the latter part of December, and rarely after the twentieth of January, though sometimes there is cold weather in February, and even in March, but usually the farmer is running his plow or seeder in February. In the mountains the spirit thermometer sometimes records as low as 40° to 45° below zero, but this only occurs for a night or two, and during the same time in the settled portion of the county the thermometer only marks about 25° or 30° below zero. But notwithstanding this low range of the thermometer during one or two days of the winter, it may truthfully be said that there are but few days in winter in which the thermometer drops as low as zero, and owing to the dryness of the atmosphere, people do not suffer from the cold as they do in damper localities. The extent of cold weather here is about five or six weeks, and often not over four. Sometimes we pass through the entire winter without any really cold weather, as in the winters of 1888-89. Winters usually break early, and the February of this climate is most frequently similar to April and March, similar to the month of May in Illinois or New York. Snows frequently fall in winter, but the Chinook winds soon take these away, and the air becomes as mild and pleasant as spring. Though in summer the weather is not usually oppressively warm, we have a few hot days, but we do not suffer from the heat as one would in climates where the air is moist. During the whole summer, however, the nights are cool, which is conducive to refreshing slumber.

There is no large amount of fertile Government land remaining near shipping points open for settlement, most of this having been taken up; but in localities somewhat remote from towns and railroad stations, there is still quite an amount of Government land subject to entry. A great deal of land was thrown open to settlement during the year 1891, under act of Congress of September 26, 1890. This was a portion of the grant made to the Northern Pacific Railroad Company in 1864, and was declared forfeited by act of Congress, comprising many thousands of acres. This having reverted to the Government, is open to settlement under the homestead law, subject, however,

for two years from February 3, 1891, to the prior claims of those who settled upon these lands before September 29, 1890, with the intention of obtaining title thereto from the railroad if earned, or from the General Government if declared forfeited. Much of this land is very desirable, and a good deal of it is not yet claimed. There is still much land that must in a few years become very valuable that can be taken up under the Homestead Act, and there is some that can be located under the Stone and Timber Acts. The Preëmption and Timber Culture Acts have been repealed by act of Congress of March 3, 1891, so nothing farther can be done under those. Some claims can be purchased from present holders. A large part of the lands of the Umatilla Indian Reservation that were offered for sale to the highest bidder last spring were not sold, and these will doubtless soon be offered again, as the law provides that such of these lands as were not sold when offered for sale in April, 1891, shall be re-offered at the discretion of the Secretary of the Interior, and in the manner prescribed by him. So, it is reasonable to suppose that the re-offering of these lands will not be long delayed.

The principal towns in Umatilla County are: Pendleton, the county seat, with a population of about 4,000; Milton and Freewater, 600; Weston, 500; Athena, 600; Adams, 150; Helix, 200; Alba, 300; Echo, 400; Umatilla, 500; Foster, 100; besides the stations scattered along the different lines of railway. These towns are supported by the country surrounding them, and their thrifty condition speaks volumes for the prosperity of the farmers and ranchers whose trade sustains them.

The total value of all property in this county as returned for the purposes of taxation in 1891 was $10,768,342.

PENDLETON

Contains a population of about 4,000, is the county seat, and located nearly in the center of the county. It is a thriving business place, substantial and growing, surrounded by a country rich in agriculture and stock-raising. The Union Pacific Railroad passes through it, and it is the end of a division. The Spokane branch of the Oregon Railway & Navigation Company's road terminates here, and it is also the terminus of the Oregon & Washington Territory Railroad. In 1891 the gross assessed valuation of property was $1,650,000. The Umatilla River flows through the town and furnishes ample and available water power for manufacturing purposes. It is provided with good water-works, supplying pure water for its inhabitants, with sufficient force from a reservoir on a hill above the town to be effective in case of fire. There is an efficient fire department, and light is supplied by electricity. There is a fine public school-building, constructed of brick, large, convenient and modern, in which school is kept ten months in the year. There are also the Pendleton Academy and a Catholic boarding-school, both of which own their grounds and buildings and are in a flourishing condition. Seven different churches are located here, the houses of worship all being comfortable and creditable edifices. Lodges of Masons, Odd Fellows, Ancient Order United Workmen, and Knights of Pythias meet regularly, each having a good membership. Manufacturing is represented by two flouring mills, one of 600 barrels and the

other of 100 barrels capacity daily; foundry and machine-shops of the Pendleton Manufacturing Company, sash and door factory and planing mill, and two cigar factories. The hotel accommodations are ample. The Hotel Pendleton is a three-story brick building, the Golden Rule Hotel, also a three-story brick, the Villard House, a three-story frame building, and the Bowman House are the principal hotels. The houses are well conducted. Three banks are doing business,—a savings bank and two National Banks. All three enjoy a large patronage; the total deposits of all do not fall far short of one million dollars. Three newspapers are published in Pendleton — *The East Oregonian*, *The Tribune*, and the *The Alliance Herald*. The first is published daily, semi-weekly and weekly, and the other two are published weekly. Each has a large circulation. The Court House is a modern brick structure, built in 1888 at a cost of $90,000. The business houses are principally of brick, modern and imposing.

Union County.

Union County is east of Umatilla; a narrow part of the northern part touches the State of Washington and extends southerly, widening as it follows the line of Umatilla County on the west, continuing east along the northern boundary of Baker around until its eastern side reaches the western boundary of Idaho. Out of the extreme northeast corner of this county, the Legislature in January, 1887, carved Wallowa County. Thus Union is bounded on the east by Wallowa County and the Territory of Idaho.

The Oregon Railroad and Navigation Company's road, which, with the Oregon Short Line and the Union Pacific, makes the great route from Kansas City and Omaha to the Northwest, passes in a northwesterly direction through the county. La Grande is the end of a division and the principal place of business. Union County contains 1,955,400 acres, of which 1,497,500 acres are surveyed. The unsurveyed portion is mostly mountains, valuable for timber, for pasturage, and in many places rich in minerals. The largest body of agricultural land is the Grand Ronde Valley, which contains 300,000 acres of rich level agricultural land. The Grand Ronde River flows through the valley from the southwest to the northeast. Numerous small streams start from overflowing springs in the hills which surround the valley, and flow into the Grand Ronde. The soil is adapted to the culture of grain, hay, Hops, fruit and vegetables. All these are shipped, besides Flour, Bacon, Wool, Hides, Horses, Cattle, Sheep, and Lumber. Pine, Eagle, and Powder Rivers, Clover Creek, Starkey Prairie, and Indian Valleys each contains a considerable body of agricultural land, and have the same general character as the Grand Ronde Valley. The hills and mountains bordering the valleys are covered with a fine growth of timber and grass. Lumber is at no point many miles distant from the agricultural lands. Many small valleys are to be found in these localities. Rainfall is sufficient to mature crops; such a thing as a failure has never been known. On the other hand, there are no long rainy seasons. The climate as a whole has many advantages. There are no long cold winters, nor excessive heat, or long rainy seasons. Summer nights are delightfully cool and pleasant.

The mountains protect from cold "northers," which would sweep over an open country.

The soil is generally alluvial and sandy loam, from three to twenty feet in depth; subsoil usually gravel. The soil is rich and produces everything abundantly that is raised in a temperate climate, except it may be Peaches, and these do well in some localities. Large quantities of hay are shipped to the counties farther west. From twenty to sixty bushels of Wheat, forty to eighty bushels of Oats, and forty to ninety bushels of Barley are raised per acre.

The stock interests occupy the attention of a considerable number, and will continue to do so. The mild winters, extensive ranges, productive grain and hay lands, absence of contagious diseases, pure water everywhere, makes this now, as it always will be, a choice location for stock. Fattening cattle for shipment is a growing business.

Dairy interests are assuming importance in the county. The advantages for this line of business are unexcelled.

The mountain streams in this county, and in nearly every other for that matter, are stocked with fish. The most common here are Salmon, Red Fish, and Trout. For game there are Deer, Antelope, Mountain Sheep, and Bear, Grouse, Prairie Chickens, Pheasants, Ducks, and Geese are plentiful.

The land in Grand Ronde Valley was principally State land and has all been sold. Although these lands have been sold, the proportion under cultivation will not exceed one half. Considerable is owned in tracts of 320 to 1,000 acres, and nearly every business man in the town owns a 320-acre tract. Many tracts owned by people living in town are improved and can be purchased at reasonable rates. Those living on farms are, as a rule, satisfied. Little land is offered for sale by this last class, except in cases where they have more land than they can conveniently handle. Prices for improved valley lands will range from $10 per acre upward. Unimproved lands, $6 per acre and upward. These prices are for land in Grand Ronde Valley, deeded and with perfect title. Land in the foothills and small valleys is selling for from $6 to $12 per acre for improved, and $3 to $7 per acre for unimproved.

For the mining interests of Union County see the chapter on Mines and Mining.

Union is the county seat, and has a population of about 1,200. It is situated in about the center of the county, on Catharine River, which furnishes ample and available water power for manufacturing and other purposes. The town is lighted by electricity, and is provided with excellent water-works and an efficient fire department. Manufacturing interests are represented by one flouring mill, one planing mill, and a sawmill; a woolen mill is in course of construction. There are numerous mercantile establishments doing a good business in merchandise, shipping live stock, wool, hay, grain, and lumber. The town has Baptist, Methodist, Episcopal, and Presbyterian Churches, a good public school with five teachers, a bank, and two weekly newspapers. Union is substantial and growing.

LA GRANDE.

The following report from La Grande is furnished by Wm. Miller, Secretary of the Board of Trade:

La Grande is the central point of supply for a large agricultural, timber, and grazing district, comprising an area of not less than five thousand square miles. It is situated on the west side of the Grand Ronde Valley, and contiguous to the most thickly populated portions. Its trade, however, is not confined to the Valley of La Grande, but extends to adjacent farming and grazing districts, as well as to an extensive timbered region on the eastern slope of the Blue Mountains. Within a radius of twenty miles there are twenty-five Lumber manufacturing plants, with a daily output during the cutting season ranging from 10,000 to 100,000 feet. One lumbering plant within three miles of La Grande employs in its mills and at the logging camps one hundred and fifty men, and during last season cut 11,000,000 feet of logs. Another plant equally as large was put in operation early last fall.

The Union Pacific Railroad passes through La Grande, and makes this point the end of one of its divisions. The company has established here repair shops, round house, coal bunkers, etc., at a cost exceeding $100,000. There are upwards of three hundred men employed by the company at La Grande, and the monthly pay-roll averages $30,000. A branch of the Union Pacific extends from this place to Elgin, a distance of twenty-two miles, the terminal point being Indian Valley.

The population, according to the census of 1890, was 2,600, and it is claimed the increase has been such as to make it 4,000 now The enrollment of children of school age is eight hundred and forty, with an average daily attendance of six hundred and sixty-seven. There is an elegant, convenient, and modern public school building, costing $12,000, containing six rooms, besides two ward buildings of four rooms each. A principal and twelve teachers are employed. There are seven church organizations, and five houses of worship, represented by the Baptist, Catholic, Methodist, Episcopal, and Presbyterian denominations. There are two weekly newspapers, the *La Grande Gazette* and the *Grand Ronde Chronicle.*

During 1889 thirty-five residences were erected; 1890, one hundred and fifty-two, and in 1891, one hundred and eighty-three. The number of brick houses in 1890 was ten; the present number is twenty-six. The business firms include three agricultural implement houses, three bakeries, two banks, with an aggregate capital of $140,000, four barber shops, three blacksmith shops, one boot and shoe store, one brewery, two cigar and tobacco stores, three drug stores, one brick and tile factory, two feed stores, one furniture store, nine general merchandise stores, two gents' furnishing stores, six grocery stores, crockery store, four jewelry stores, three livery stables, four hotels, three tailor shops, four meat markets, marble and granite works, two hardware stores, music store, three planing mills, nine saloons, and three restaurants. The town is lighted by electricity, has a $50,000 fund on hand with which to construct city water-works, and has an efficient fire department. The streets are

commodious and well improved, with ample and durable sidewalks. La Grande is a substantial and progressive business place.

The other towns of Union County are North Powder, Cove, Cornucopia, Island City, Summerville, and Elgin, all prosperous and growing towns.

The total valuation of property in this county, as returned for the purposes of taxation in 1891, was $6,948,017.

WALLOWA COUNTY.

This county was created in 1887 from a portion of Union. It is in the extreme northeastern portion of the State, and is bounded as follows: Commencing at the northeast corner of the State of Oregon, on Snake River; thence west on the State line to where it intersects Grand Ronde River; thence in a southwesterly direction up the center of said river to the mouth of the Wallowa River; thence in a southwesterly direction up the center of the said Wallowa River to the mouth of the Minum River; thence in a southerly and easterly direction up the center of said Minum River to its source on the summit of the Powder River Mountains; thence following said summit or divide of the Powder River Mountains in an easterly direction to a point about twenty miles due west from Snake River; thence due east to what is known as Limestone Point, on the east line of the State of Oregon; thence north following said east line of the State of Oregon to the place of beginning. The width of the county is about sixty-five miles, and its extreme length is about seventy miles.

There are three valleys in the county, besides smaller ones, and these three are known as the Lower, Middle, and Upper Wallowa Valleys. The Lower Wallowa Valley is about five miles long and three miles wide. The soil is of excellent quality, and produces the cereals and large quantities of hay. The Wallowa River passes through this valley, and there is an abundance of timber along the streams and slopes of the hills adjoining, consisting of Pine, Cottonwood and Alder. Bear Creek empties into the Wallowa within the valley, which stream is also supplied with timber. All around the valley is a rolling, hill country, timbered somewhat, but without underbrush, so that a wagon can be driven over it in any direction. The soil is good, and here is some of the finest pasturage in the State. The land will, and does, produce the grains richly. These hills continue topographically about the same east to Snake River. The whole of it is supplied with ample timber for fuel, fencing and building purposes. Snow falls in this county from three to four feet in depth; but with its timber and richest of grass lands there is no difficulty to prepare for the snows of winter. Wild berries of all kinds grow luxuriantly. Fruits do well in this valley, and even Peaches have been raised of excellent size and finish, and possessing a delicious flavor.

The Middle Wallowa Valley is situated between the Lower and Upper valleys. It is about nine miles long and seven miles wide. The surface is not absolutely level, nor is the valley one open sweep. The land is somewhat rolling, and over a set of low hills is another valley, and around another elevation is still another valley, and so on. On the southwest of this valley the mount-

alns are covered with good timber of Fir, Pine, and Tamarack. The valley proper, which is comparatively level, contains good soil, and anything suited to a temperate zone can be grown. The hills surrounding contain good grain lands in places, and afford splendid grazing fields. The Wallowa and the South Fork of the Wallowa River flow through this valley, hence the water supply is good. Fish are plentiful, as they are in all of Oregon's streams; and in these, runs of Salmon are frequently known. The winters here are somewhat shorter than in the lower valley, but in that they do not continue on an average of more than two months. This valley has been settled and the land cultivated for about six years. Previous to that time it was used principally by herders running vast bands of Cattle and Horses over it. The six years' work has demonstrated that the soil will yield all the grains and Corn bountifully, and that the fruits do well. Some portions of this valley and the one heretofore mentioned need irrigating, and fortunately the watercourses are of sufficient height above these portions that water can easily be spread upon them. It is proper to say, that even now the principal interest of the people in this entire county is stock-raising, but agriculture is yearly receiving more attention.

The Upper Wallowa Valley is separated from the middle valley by a range of hills. The valley is level, and is about fifteen miles long and six miles wide. It is well supplied with timber, and has an abundance of water. In this valley are many beautiful farms which fully speak for the quality of the soil. The hill lands surrounding this valley are excellent for grazing purposes, besides containing a large amount of good agricultural land.

The northern portion of this county is drained by the Grand Ronde River and Joseph Creek. On the mountains bordering the Grand Ronde is fine timber, sufficient for fuel, fencing, building, and manufacturing purposes. There is an abundance of grazing country in this part of the county, and also considerable agricultural land. The soil is deep and productive.

The Imnaha country takes its name from the principal stream which flows through it. It is a vast gorge through the mountains its entire length, a distance of about seventy-five miles. The mountains range from 2,000 to 3,000 feet high, and are generally bare of timber. They are covered with Bunchgrass, and afford splendid stock range. Other streams flow through this county and empty into the Imnaha. It is a fine section for grains, fruits, and vegetables, although it is principally devoted to stock. There is plenty of good public land open for settlement, and that which is somewhat improved might perhaps be purchased for from six to fifteen dollars per acre.

Joseph is the principal town in the county, and is the county seat. It is located in the southern part of the upper valley. The population is probably 300 and contains schools and churches, flouring mills, sawmills, and mercantile houses, all doing a good business. Alder, in the same valley, is a flourishing little town. Wallowa City is also building up rapidly. Lostine is in the middle valley, and is a thriving town.

The climate of Wallowa County is peculiar, and when the latitude of the country and its altitude are considered, it may be looked upon as a little out of the usual line. The elevation of the Upper Wallowa Valley above the sea is

estimated at about 4,000 feet, yet the climate is mild as compared with the Northern States east of the Rocky Mountains.

The spring weather generally is as pleasant as could be expected in this latitude. Instead of the spring rains, we have to a great extent what are called "skifts of snow," that usually remain upon the ground only a few hours. These are somewhat disagreeable, but they serve the purpose of furnishing moisture to the growing vegetation and crops. The summers, so far as our experience goes, are models of perfection. Extreme and sultry heat is unknown. The warmest day in summer one may sit in the shade in usual clothing and feel not the slightest degree of discomfort. The summer weather frequently extends far into autumn, and in the writer's experience September and October have been as pleasant as could be wished for. Such is a general outline of the climate in the upper valley. In the hills, and as you approach the mountainous country, the climate changes natually, while with the decreasing altitudes of the middle and lower valleys it grows milder, and the seasons differ accordingly.

One of the peculiar and important features of our winter climate is what is termed the Chinook wind. We shall not attempt any scientific explanation of this peculiar zephyr here, as its effects are sufficient. This wind is usually well defined, and its presence immediately felt; but even in its absence the wind is still a moderate southwestern, which has been warmed by the Japan current and serves to keep the temperature at a very comfortable height. Snow melts with wonderful rapidity under its influence, and its coming is always hailed with expressions of delight by those who know its effects. Without the Chinook wind, or what is probably the same, the warm winds from the Pacific Ocean current, we would have a much different story to tell of our winter climate.

The total value of property in this county returned in 1891 for the purposes of taxation was $1,315,982.

Wasco County.

By G. W. Ingalls.

This land of grass, as its Indian name implies, was originally an empire in itself, but its area was greatly reduced by act of the Legislature in 1890, when six full townships were taken from Wasco and added to Sherman County. It now has an area of about 3,024 square miles. The northern line of Wasco County extends east from the Cascade Mountains along the Columbia River, with high bluffs of basaltic rock. Beyond these are beautiful farms, attesting the wondeful fertility of the soil, and delighting the eye with an interesting and unexpected prospect of rolling prairie, with a deep soil of dark loam, capable of producing all kinds of small grains, and fruits that can be raised anywhere in the same latitude. The grazing lands are of a more rolling nature, but with the same character of soil. These usually comprise also the foothills, or elevated boundaries of the valleys, and, when cultivated, produce in perfection. These lands are covered with a rich growth of Bunchgrass, on which stock feed and fatten the year round. The west line of the county, commenc-

ing at Cascade Locks on the south side of the Columbia River, runs southerly in the black timber along the summit of this green mountain range, passing to the west of the snowy cap of Mount Hood, and terminating forty-eight miles south of the base line upon the range line between townships 8 and 9 south. The soil covering the western portion of Wasco County, even upon the high ranges of the mountains from 3,000 to 4,000 feet above the sea, is of great depth and capable of great production, as evidenced by the extraordinary size and height of the timber which composes its very valuable and extensive forests of Pine, Fir, Larch, Tamarack, and Hemlock. All of this western portion of the county is furnished with abundant streams of water, which rise high up in the black forest, and in one case in a lake over 4,000 feet above the sea level, of considerable magnitude. White River runs its ashy current directly out from under an iceberg upon the south side of Mount Hood and empties into Hood River. All of the creeks and rivers which drain the eastern slope of the Cascade Mountains, after leaving the timber on their course eastward, fall into the Des Chutes River, adding materially to its deep and rapid current, which is affected but little by spring and fall rains, and which rarely freezes over its main channel. This stream affords water power of the most valuable character near its mouth and at Sherar's Bridge.

While fully three quarters of this county is estimated to be good agricultural land, capable of producing Wheat and all the small grains to perfection, it may be said to be only entering upon its agricultural career. Only of late years has the idea been dissipated that a lack of moisture would not permit the raising of Wheat. Experiments have demonstrated that on its highest hills the largest yield may be expected; and now the country will average quite twenty-five bushels per acre by careless farming, and in places with good tillage and summer fallowing, fully sustain the phenomenal yield of forty or fifty bushels.

The John Day and Des Chutes Rivers, with their numerous smaller tributaries, give the county a never-failing supply of pure, cold, mountain water. These rise hundreds of miles distant, traverse the country, and afford fine water power along their whole course, besides abounding in fish of the choicest varieties.

To speak of Wasco County agriculturally and not mention particularly its fruit productions, would be but to do faint justice. All varieties are produced in great perfection, and for luscious flavor have a well deserved reputation. Its Apples are fine, and its Peaches, Apricots, Plums, Prunes, Cherries, Grapes, Pears, and Berries are unsurpassed on the Pacific Coast. Fruit orchards are multiplying. The size of the fruit is particularly striking, and an unprejudiced taste must accord them a delicacy of flavor superior to most California fruits. Garden vegetables and melons of great size grow and mature here, and often without more than slight attention. Melons are shipped from here as far east as Chicago.

The possibilities for fruit culture that lie hidden in the valleys and hills of Wasco County, especially in that portion which borders on the Columbia River and stretches from two to ten miles southward, will not be fully appreciated by the outside world until they are seen, and it is realized what has

been done already in hundreds of places in comparatively small patches and with all the disadvantages of insufficient capital for the proper development of this important industry. The earlier orchards were all planted on creek bottoms or on the margins of streams, because the first settlers had no idea that anything (let alone fruit) except Bunchgrass and Sagebrush could be grown on the hills and plateaus. Now it has been proven by actual experience that our very best fruit and grain lands are on the slopes and benches so long despised and neglected. We have now passed the experimental stage with these lands, and the products of tens of thousands of Grape vines and fruit trees of every variety possible to be grown in this latitude abundantly testify that no better fruit country exists on the American continent than this is. At the Portland Exposition of 1891 the fruits from this section took the first premium over the entire Northwest.

In a paper read last fall by B. S. Pague, Chief of the United States Signal Service for Oregon, at a public meeting held at Salem, the following testimony is borne to the climatic conditions of this section: "On a strip of land extending along the Columbia from the Cascade Locks to about fifteen miles east of The Dalles, and southward from three to ten miles, can be found the highest or warmest night temperature from June 1st to September 1st of any place in Oregon. I venture to make the assertion that inside of the next ten years this section will produce the best Peaches raised on the Pacific Coast; and, further, considering the area of this warm belt, more Peach trees will be planted there than in any area of ground of equal size in the State. I am only giving the facts as determined by the Weather Bureau observations, and then drawing personal conclusions."

Mr. Pague should have said, not that in ten years something is going to be done, but that even now this section is producing the best Peaches grown in the State. And this is not truer of Peaches than it is of Pears, Apples, Plums, Cherries, Prunes, and Strawberries. There are nearly two hundred orchards and vineyards in this county, varying in size from five to one hundred and sixty acres each. There was organized this year a fruit company with a capital of $1,000,000. This company has purchased 2,500 acres of growing orchard and of the choicest fruit lands near The Dalles, and is now engaged in setting the same to trees and vines.

The Dalles is the county seat, situated upon the bank of the Columbia River, about two hundred miles from its mouth and eighty-eight miles east from Portland, on the Union Pacific Railroad. It has about 4,000 inhabitants, three hotels, three banks, two daily and one weekly newspaper, one large flouring mill, three public schools, an independent academy,—created a normal school by act of the Legislature in 1888,—a Catholic academy, public waterworks, electric lights, a brewery, a large flume canal eighteen miles in length, extending to the timber belt of the Cascades, capable of transporting 125,000 feet of lumber and from 125 to 140 cords of wood per day from the mills to the city. The United States Land Office is also located here. It is the head of deep water navigation, and with the completion of the Cascade Locks an entire fleet of ocean vessels can be accommodated here. There are ten fish-wheels on the river in this immediate vicinity, and in 1890 there were upwards of three

million pounds of fish shipped from this place that were packed here, besides a large amount of fresh fish sent to Eastern markets. Nearly 200 car loads of Hides, nearly 10,000,000 pounds of Wool, 4,200 head of Cattle, 100,000 head of Sheep, 1,800 head of Horses, and over 100 car loads of fruits were shipped from this section the past season.

The minimum fall of water from Celilo to The Dalles (13 miles) is 86 feet; the maximum, 120; the mean, 100; from Celilo to Wallula (114 miles) the fall is 150 feet; from Wallula to Lewiston, Idaho (124 miles), the fall is 390 feet. The body of water at The Dalles is enormous, as can be readily seen. The Columbia drains a country of over 300,000 square miles, and has a depth of fifty feet for over one hundred miles from The Dalles. The amount of horse power at The Dalles is not only greater than the combined horse-power of Willamette, Spokane, and St. Anthony's Falls, but is almost illimitable.

The unusual dryness of the atmosphere in this locality makes it especially desirable for invalids, more particularly for those troubled with asthmatic and lung difficulties. The dryness contributes to the speedy seasoning of lumber, and this section is specially adapted to furniture, wagon, carriage, car, and agricultural manufactories. This locality is also free from fogs. The occasional Chinook wind from the coast, coming up the Columbia River and through the Cascade Mountains, with their Pine forests, possesses an almost imperceptible moisture which, while not injurious to invalids, purifies the air, and is quite refreshing in the hot days of summer. These Chinooks do not prevail in winter. From the United States Census Reports of 1880 it appears that this is the healthiest section in the entire country, the death rate being only 8.35, while California was 14.71; Colorado, 11.25; Florida, 11.7; New Mexico, 16.61; Arizona, 18.65.

There is a roller-process mill at The Dalles, another at Dufur, a third at Badger Creek, and a burr mill at White River and also at John Day.

The Union Pacific system of railway lines runs across the north line of the county on the banks of the Columbia River, giving direct rail connection with the markets of the Eastern States, and the mining camps of Eastern Washington, Oregon, and Idaho, as well as with the Pacific Coast cities on the west. This company has a line of steamers plying between the Cascades, Portland, and Astoria; and this, with The Dalles, Portland & Astoria Navigation Company in connection with the new portage railroad at the Cascades, affords cheap transportation for the products of this county to the coast cities.

The town of Hood River has advantages for manufacturing of an excellent character. The best water power, associated with contiguous timber, an excellent soil, and delightful climate offering homes for varied industries. The situation of the town upon the railroad and upon the Columbia River, and its peculiar climate suited to fruit growing, make it a location of much value. It has a population of about 500, with two churches, a good school-house, one hotel, one newspaper, several stores, and a number of fine residences.

The enterprising town of Dufur is about fifteen miles south of The Dalles, having about 500 inhabitants, one newspaper, one public school building, two churches, and several good stores and attractive residences.

There were in this county in 1891 over 3,000,000 acres of tilled ground,

218,000 Sheep, 20,000 Horses, 25,000 Cattle, 5,000 Hogs. The total assessed value of property in 1881 was $3,578,745, which is a large increase within the past five years, notwithstanding the great reduction of area by the formation of the new county of Sherman.

Washington County.

Washington County is bounded on the north by a range of hills called the "Scappoose Hills." This range, reaching an elevation of possibly one thousand feet, separates the west side of the Willamette Valley from the Columbia River. Continuing eastward, with diminished height, these same hills border the western side of the Willamette River, and forming the eastern boundary of Washington County, separates it from Multnomah County. On the south Washington County is bounded by Yamhill County. On the west is rises to the crests of the Coast Range, the summit of which forms the boundary line between Washington and Tillamook Counties.

It is pretty nearly square in form, and contains something over 300,000 acres. As already noted, it is the most northerly and nearest the seaboard of all the agricultural counties of the State.

The soil of Washington County varies, of course, according to local conditions, but may be described in general as a strong clay subsoil, with a covering of from a few inches to several feet of the richest loam, and can be plowed without injury to soil almost every month in the year. The upland, or hill land, is very pliable and can be plowed at any season of the year. The soil of this county is of great fertility, and so durable is it that on the Tualatin Bottoms the thirteenth successive crop of Wheat has yielded forty bushels to the acre, and the durability of the soil in other locations indicates that nature has endowed it with almost inexhaustible fertility. Farmed as the lands of the Genessee Valley or of Northern Illinois are farmed, there is hardly a reasonable limit to the capacity of our soil.

The level portion of this county — about four fifths of its surface — is about two thirds natural prairie, and one third brush and timber land. The hill is practically all brush and timber, though occasional patches are bare by nature.

This timber, which in the past has seemed an impediment to settlers, will in the near future be recognized as one of our greatest sources of wealth. The rapid denudation of the hills throughout the central part of the valley plainly foreshadows the time — not far hence, either — when these vast forests encircling and banding Washington County will add vastly to the industrial resources of its inhabitants.

There are many varieties of timber. The most valuable for milling purpose are the common Fir and Cedar. There is a large quantity of White Fir, some common or pitch Pine, and on the mountainous west border of the county is a strip of very valuable White Pine. With these varieties are mingled Hemlock and Spruce, some of these of gigantic size, in many cases being three hundred feet in height. Besides these several varieties of timber, from which the building and fencing lumber is sawed, large quantities of which are shipped to the counties of the valley further south, there is an almost inexhaustible

supply of the finest White Oak. No one has fully realized the fact, which a few more years will make plain, that this Oak timber will be the source of numerous manufactories of all kinds of wooden implements. Furniture lumber in great quantity and of good quality is furnished in the beautiful Maple, Ash, and Alder.

As already noticed, about four fifths of the area is level; the remaining fifth is a circlet of low hills and mountains, almost completely enclosing the plains. For some distance up into these hills extend fertile valleys, down which pour clear and cold mountain streams, that furnish an almost unlimited water power, waiting for development by the enterprising capitalist. These unite in five principal branches, whose names, beginning on the east, are Rock Creek, Dairy Creek, Gales, Scoggins, and Patton Creeks. These branches unite near the center of the county, and form the Tualatin River. This stream, emptying into the Willamette near Oregon City, is of navigable size from Cornelius for about forty miles, to a point at the head of the rapids near the mouth of the river. A steamboat of one hundred and twenty tons measurement did in fact, before the railroad was built, make regular trips to Cornelius, Hillsboro, and other points on the river, connecting with the Wallamette at Oregon City, as well as Oswego, by a portage of between two and three miles.

Washington County presents a most pleasing as well as most convenient alternation of hill, plain, valley, prairie, and timber. Little even of the hill region is so steep as to forbid cultivation, and none of the surface of the country is so flat as to forbid good drainage. The soil on the highest hills is of good quality, and in many places very easily brought into cultivation.

The running streams of this county furnish an abundance of pure water for stock, and never-failing springs of pure water abound. There is no difficulty in getting plenty of well-water at a depth of fifteen or twenty feet.

No part of the Willamette Valley is superior to Washington County in natural adaptability to fruit culture, and no part of Oregon can excel it in the quality of its fruit productions, except possibly Grapes and Peaches. Among its wild fruits are Strawberries, Blackberries, Huckleberries, and Raspberries. Many other kinds are found in the mountains, all of them of excellent flavor and quality. As might be inferred from the quality of its wild berries, its cultivated fruits are of good size and flavor. This is especially true of the foothills and the timber and brush lands bordering the various streams that meander through the county. The loose soil, the warm nights of spring, and the greater degree of dryness of autumn, make the rolling timber and brush lands, especially the foothills, the natural resort of the nurseryman and fruit culturist. Every kind of fruit native to a temperate zone, except perhaps the Peach and Grape, acquires excellent flavor Peaches fairly good can be raised in abundance. Cherries, Prunes, Plums, Pears, Quinces, and Apples, as well as all the common small fruits, and in some spots Grapes, reward the light labor of the farmer and fruit-raiser.

The great staple product of this county, as of the west of Oregon, is Wheat. The usual yield of Wheat is from eighteen to forty bushels to the acre, the difference in yield depending on manner of cultivation more than difference in

quality of soil. This yield might be increased by more careful farming. Equaling Eastern Oregon in amount of yield, this region perhaps surpasses it in fineness of product. Oats yield with good cultivation an average of forty to fifty bushels to the acre, frequently yielding on the bottom and beaver-dam land 100 to 125 bushels to the acre. There is now beginning to be greater diversity in the products of our farms than formerly. The experience of the past has convinced our farmers that they will do well to take advantage of their great natural facilities for dairy products, for supplying meat markets, and for raising vegetables. Washington County is probably surpassed by no county in Oregon in its natural capacity for all these products.

The soil of our lands develops Clover of a rankness and richness such as few other regions in Oregon or elsewhere can show. Besides Clover, this county is unsurpassed in its capacity for producing all kinds of root crops, such as Carrots, Parsnips, Turnips, Beets, Rutabagas, etc., the value of which in the work of the dairy is well known to all practical dairymen. In addition to Clover and root crops, Timothy, Redtop Orchard Grass, Rye Grass, and all other tame and cultivated grasses are grown. With reasonable care the farmers' stock can be abundantly supplied with green grass during the whole of the year. The beaver-dam lands and the swale lands which thread the forests of the several parts of the county, produce enormous crops of the several varieties of the cultivated grasses—three and four tons to the acre of Redtop and Timothy being no unusual crop.

Beaverton is especially prominent by reason of the large tract of beaver-dam land lying in its vicinity This, as the name indicates, is formed by the choking or damming (supposed by beavers) of streams, and the consequent accumulation of leaves and all manner of rotten débris. The soil is of great depth, mellowness, and fertility. Enormous crops of Hay, Beets, Cabbages, Carrots, Onions, and in fact all other root crops are produced abundantly, six hundred bushels of Onions and thirty to forty tons of Carrots or Beets to the acre being no unusual crop. The Onions raised on this beaver-dam land are exceptionally fine, and years of cultivation of this crop on the same ground improves the quality as well as quantity. Beaver-dam lands, however, are not confined to the vicinity of Beaverton; many fine tracks of it are found in other parts of the county, that lying along the Tualatin River and its principal branches being extremely fertile. This portion of Washington County has a nearer and better and more convenient market than any other part of the State, except a small part of Multnomah and Clackamas Counties.

Passing on from Beaverton we reach Reedville, about fourteen miles from Portland. Here we see fine farms and pleasant homes. We touch the south edge of the largest plain at Hillsboro, the county seat, twenty miles from Portland. This beautiful plain stretches northward eight miles to the foothills. Here we must pause a moment to observe the large flouring mills and warehouse near the depot. One of these mills is noted for the large quantity and quality of oat meal manufactured, which is shipped to all points on the coast. The manufacture of this article furnishes a convenient market for large quantities of the superior Oats raised in Washington County.

Hillsboro is a thriving, pleasantly situated, incorporated town of about

1,000 inhabitants, with a large public school-house, neat church buildings, and public halls. The large amount of business being done by the various firms engaged in mercantile, mechanical, and professional operations is an indication of the energy of its citizens and of the prosperity of the surrounding country. The amount and nature of the improvements done in years past under the discouragements arising from a scanty population give an earnest of what will be done in the more stimulating times coming.

The next point beyond Hillsboro, on the railroad, is Cornelius, a thriving, busy town with an active, energetic class of business men engaged in mercantile and mechanical pursuits. A large, substantially built and well furnished public school-house, and the neatest church in the county, are among the public buildings. Two hotels, and two livery stables, furnish sufficient accommodations to visitors and travelers. The farmers are furnished abundant storage for the surplus grain raised on their farms, at the largest warehouse on the road, and at reasonable rates.

Three miles from Cornelius we come to Forest Grove station, about one mile south of the town of that name. This is an incorporated town—a beautiful, cozy place of about 1,000 inhabitants. We see here well-furnished stores, a large furniture factory, a fine town hall, two well-furnished hotels and livery stables, and three neat churches. Here also is located Pacific University, a well and most favorably known collegiate and academic institution. It is amply endowed, well provided with library, and splendidly furnished. Besides this, there is an excellent public school, running nine months in the year.

Cornelius and Forest Grove belong essentially to the same region. They are in the southern part of a fertile plain extending, with few interruptions, about ten miles northward, and having numerous arms which ramify among the mountain barriers.

Six miles from Forest Grove is Gaston, and here the railroad enters Yamhill County. So pausing here only long enough to see that the same fertile, though not very highly cultivated, land continues, expanding on the south into that extensive body of land, mostly beaver-dam, known as Wahpatoo Lake, we retrace our steps in order to notice a little more in detail some of the towns through which we have come.

At Dilly, between Gaston and Forest Grove, and in the midst of a section of country noted, even in Washington County, for its large yield of Wheat and other grains, we find a large flouring mill. At the Forest Grove depot, another flouring mill.

Six miles north of Forest Grove is Greenville, a small town located in the midst of a superb farming region. All through this portion of the county we see farms of magnificent possibilities, some finely improved, more giving no adequate presentation of what is in them.

The cost of building is, by reason of proximity to the fine timber and numerous sawmills, much less in this than in the more open countries to the south. Mechanical labor is about the same. Cost of living does not differ materially from that in other parts of Oregon.

Washington County is inferior to no part of Oregon in its educational facilities. Besides the university at Forest Grove, our common schools, though

not all that we hope the future to make them, are fully equal to those of other parts of the State. The county is divided into forty-four districts. These districts have good school-houses, many of them furnished with all the necessary modern improvements for the comfort of scholars. Public schools are kept in each district from three to nine months in the year, free to all children from six to twenty-one years of age, residing therein.

We next speak of the prices of land. On this subject immigrants can be assured that the lands of Washington County that are for sale are cheaper in proportion to quality and location, and the other advantages before referred to, than any others in the Willamette Valley. They vary, of course, all the way from $4 or $5 to $60 per acre; the former being the cost of fertile unimproved timber and brush land, and the latter that of the best and most highly cultivated land in the immediate vicinity of the larger towns. We may say, however, that fine farms, reasonably well improved and well located, can be purchased on easy terms at from $15 to $40 per acre. To the settlers desiring to take up Government land we would say that in the circlet of hills which transform Taulatin Plains into a vast amphitheatre, there is yet open for settlement a large quantity of fertile, though brushy and somewhat broken. land. Twenty years from now will see these surrounding hills transformed into orchards and gardens, and smiling fields of grain and luxuriant pastures. Land cand be purchased of the railroad at reasonable prices and on reasonable terms. Heretofore there has been a decided disposition on the part of owners of large tracts of land to hold on to the same, but a more liberal spirit is now prevailing, and many of them are now selling and offering to sell in small tracts, one hundred acres or less. From forty to one hundred acres near to market makes a farm sufficiently large when well improved to support any ordinary sized family, if industrious and economical, with all the necessaries and many of the luxuries of life.

It is sufficiently evident from what has been already said, that thus far in the history of Washington County farming has monopolized the attention of all. But when it is borne in mind that by reason of the abundance and variety of its timber, and the number and accessibility of its streams, furnishing almost unlimited water power, and its inexhaustible mineral resources, Washington County has every natural facility to encourage the establishing of great manufacturing interests in the near future within the bounds of its territory.

The total value of property of this county, returned for the purpose of taxation in 1891, was $6,951,125.

Yamhill County.

This county is bounded on the north by Washington County; on the east by Marion and Clackamas; on the south by Polk, and on the west by Tillamook. It contains 343,733 acres of agricultural land, and the cereal product of of 1891 was 3,295,251 bushels. Yamhill is supposed to derive its name from "cham-ill," which means, in Indian dialect, bare hills. It is one of the oldest settled regions in Oregon, as it is also one of the best.

The soil is fertile and produces large crops of grains, grasses, and vegetables. The greater portion of the county is prairie, and the foothills that for years were supposed to be only good pasture lands, are now being largely farmed, and produce the finest quality of grain. It is estimated that about one half the soil is under cultivation, which is devoted principally to Wheat, as this product has always been in active demand. Several varieties of timber are distributed over the entire area, and from the Fir that grows so abundantly in the mountains bordering on the valley, a large amount of the best of lumber is manfactured by the mills throughout the county. The timber is Fir, Oak, Ash, and Maple.

Grasses of all kinds, especially Timothy, grow to great perfection, hence this county is one of the best stock-raising and dairying sections in Western Oregon. The Cascade Mountains in the extreme western part of the county furnish the very best spring, summer, and fall range. In the foothills, close to the mountains, can be found fine dairy and stock farms. Further back good places may be had from the Government, and it is filling up very fast. The soil, as a general thing, is as rich on the mountains and hills as in the valleys. Vegetables grow to perfection, and a failure in gardens is never known. No trouble is felt from insects in the garden. Hops are a prolific crop and quite extensively grown. Berries of all kinds grow with but little cultivation and bear every year. Fruits of all kinds do well, except Peaches. Apples grow to perfection, and the trees bear very young. Trees well cared for will bear one bushel each at four years old; Pear-trees will bear at three years old, and there is no place in the world, it is believed, where they will do any better. Plums and Prunes are the admiration of all beholders. The trees are healthy, the fruit large, clean, and free from all worms. They commence bearing at two and three years old. Fruit and berries seem to do equally as well on the high lands as in the valleys. Bee culture has been tried in the foothills and mountains, and pronounced by men in that business as equal to the celebrated bee pastures in the mountains of California.

The western part of Yamhill Valley, including portions of Yamhill and Polk Counties, will be the better understood by first giving a general description of the valley, then resorting to particulars. Few persons have an idea of the size of this valley. It is not meant, of course, the narrow strip of low lands immediately adjacent to the Yamhill River, but including the valleys of the creeks flowing into the river and the farming lands between them, west of a line drawn north and south through Bellevue, in Yamhill County. From Bellevue south to the upper Salt Creek is fifteen miles; and north to the upper settlement on Deer Creek is twelve miles; from Bellevue west to Grand Ronde is fifteen miles. Then commences the Grand Ronde Indian Agency, which continues eight miles, and here begins the settlements of Salmon and Nestucca Rivers. This makes an area of country, without including the agency, Salmon, and Nestucca Rivers' countries, twenty-seven by fifteen miles, that for salubrious climate, rich, fertile soils, timber for all purposes, water for use in house, on farm and turning machinery, stone for building purposes, including the famous mammoth rock quarry, and romantic and sublime scenery, is not excelled, if equalled on the northwest coast. There are nine creeks, large enough to propel

any machinery, meandering through the valley, well supplied with Trout, and the hills and mountains from which these creeks take their rise are well supplied with Deer, Elk, Bear, and other wild game. There are many branches and smaller creeks that flow from the table lands on either side of those creeks, making this a well-watered section. The Yamhill River is the largest stream, and is navigable at all seasons of the year to Dayton, several miles from the mouth, and during the winter season boats ascend to McMinnville.

The facilities for shipping products from this county to the seaboard are excellent, the West Side Railroad passing through it very centrally from north to south, and at White's Station, three and one half miles south of McMinnville, the narrow-gauge branches off and accommodates the people of the upper Yamhill Valley. Boats plying on the Yamhill River do a large business from Lafayette and Dayton down. The Narrow-Guage Railway is constructed to Dundee, and this county is now connected by that road with Portland.

Each town in the county has its schools and churches, education receiving especial attention. Land is worth throughout the county from $2.50 to $100 per acre, according to the situation. No county in the State has better roads than are to be found in Yamhill, and the streams are spanned by substantial bridges, that have cost the county many thousands of dollars. Fences, as a general thing, are new and in good shape, while the houses, barns, and outbuildings will compare favorably with those of other counties and States.

In 1891 the farmers of this county produced $675 for every voter, irrespective of occupation. There are ten newspapers in the county. The total value of all property assessed for the purpose of taxation in 1891 was $7,833,777.

McMinnville is the county seat, and has a population of about 2,500. It is situated on the Yamhill River, fifty miles southwest of Portland. The city is lighted by electricity, and owns its own plant, owns a good system of waterworks, has an efficient fire department, and a first-class public school. In addition to the public schools is the McMinnville College, under the auspices of the Baptists, which has an endowment of $40,000. There are two newspapers published weekly; Methodist, Baptist, Presbyterian, Christian, and Catholic Churches; lodges of Masons, Odd Fellows, A. O. U. W., Patrons of Husbandry, and a G. A. R. Post. There are two National Banks, a foundry and machine shop, a planing mill, sash and door factory, a flouring mill (capacity one hundred barrels per day), an incorporated creamery with a capacity of 1,500 pounds daily, besides a number of flourishing mercantile and other business houses.

That an idea may be formed of the amount of business done in a western Oregon town it will be interesting to examine the following statement of the business done in McMinnville for the year 1891:

Hardware and implement sales	$ 198,000
Dry goods, boots, shoes, clothing, and millinery	180,000
Groceries and provisions	98,000
Furniture and saddlery	34,000
Drugs, books, jewelry, and cigars	42,000
Flouring mill output	120,000
Lumber handled in McMinnville	52,500
Brick and tile output	9,500

McMinnville creamery product	$ 5,000
Printing office product	9,000
Butchers' products	25,000
National Bank clearances	11,626,780
Furniture, manufacturing, and jobbing	6,000

The above does not by any means aim to set forth the entire volume of business transacted in McMinnville, but it will serve as a reliable index by which a person may form a reasonable estimate of the city business as a whole.

Lafayette is situated one and a half miles from St. Joseph, a station on the Southern Pacific Railroad, west side, and is beautifully located. Its manufacing establishments are saw and flouring mills. It contains numerous business houses, a good public school with three teachers, a weekly newspaper, Evangelical, Methodist, and Presbyterian Churches, lodges of Odd Fellows, Masons, A. O. U. W., a G. A. R. Post, and has a population of 600.

Amity is situated seven miles south of McMinnville, on the California & Oregon Railroad, and is surrounded by a fine farming country, has good public schools, a steam flouring mill, mercantile houses, and is a thriving town.

Sheridan is a neat village, fifteen miles southwest of McMinnville, on the Yamhill River, and the present terminus of the narrow-gauge, upon which trains arrive and depart daily; has a good school, and does a good business in merchandising.

Dayton, on the narrow-gauge line, seven miles northeast of McMinnville, is a flourishing town, the head of navigation on the Yamhill River. It is provided with a good public school, and besides its mercantile houses, has several warehouses in which grain is stored for shipment.

North Yamhill is a prosperous town on the Oregon & California Railroad. It is surrounded by a very rich farming country, and is provided with a good graded public school, and business houses to meet the demand of a brisk trade.

Newberg is in the lower part of the county, which is settled by Friends, a thrifty people. It has a good public school, an academy, a grist mill, and a steam sawmill. It is one mile from the Willamette River, its nearest shipping point. There are business houses doing a good business.

Bellevue is situated eleven miles southwest of McMinnville. There is a good public school, and general merchandise stores.

Carlton is a small village about six miles north of McMinnville, on the Oregon & California Railroad. It has a good public school and several places of business. It is in the heart of a wealthy agricultural section, and large quantities of grain are shipped. There is a good public school, and several business houses.

West Chehalem is a small place in the northern part of the country, containing a store and a fine public school. It is surrounded by a fine farming country.

Willamina, the uppermost town of the county, is five miles west of Sheridan, on the Willamina, one of the most romantic streams in Western Oregon. The site is lovely, the fall of the stream affording magnificent water power. It has a good public school and business houses, and grist and sawmills.

Grand Ronde is situated seven miles southwest from Willamina, on the grounds where old Fort Yamhill used to stand, and where Generals Sheridan and Russell were stationed when the Civil War commenced. It has a good public school and business houses, and a saw and grist mill.

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU,
PORTLAND, Oregon, October 1, 1892.

Hon. J. T. Gregg, Secretary Oregon State Board of Agriculture—

DEAR SIR: I have the honor to forward to you, herewith, a report on the climate of Oregon, which you have requested for your "Resources of Oregon." The report is much briefer than it could have been made; yet the general climatic features of the State are touched upon; and after perusal, the reader of the report will find that it contains, in short, concise statements of all of the vital points concerning our climate.

In 1887, the writer prepared a report for your Board on the climate of Oregon, which was the first report of its kind ever published. In that report the organization of a State Weather Bureau to coöperate with the National Bureau, was urged, and your Board, realizing the advantages which would accrue to the agricultural interests of the State from it, heartily endorsed it, and in 1889 the Legislature created the Bureau. That it is a valuable adjunct to the agricultural interests of the State goes without question; and by continued effort, and with the continued help of the people, the Bureau will be of still greater value. The accompanying report is based on data collected through and by the Oregon State Weather Service. It is absolutely correct and reliable. To those readers of it who desire to still further investigate the details of Oregon climate, they are requested to address the undersigned, who will take pleasure in forwarding to them a copy of the Biennial Report of the Oregon State Weather Service to his Excellency, the Governor of Oregon, which will be ready for issuance January 10, 1893.

Trusting this report may be satisfactory to you and its readers, I am very respectfully,

B. S. PAGUE,
U. S. Weather Bureau.

THE CLIMATE OF OREGON.

By B. S. PAGUE, U. S. WEATHER BUREAU, PORTLAND, OREGON.

West of the 117° of longitude to the Pacific Ocean, and between the 42d and 46° of north latitude, lies that portion of the United States termed and known as Oregon. The southern boundary of the State is further north than Chicago, while the northern boundary is in the same latitude as that of Central Maine and Southern Canada. In a latitude so northerly, one would expect to find a rigorous climate; but here, owing to the modifying

influences, there exists a climate more similar in temperature to that of Virginia than of its equal in latitude, Maine. The causes of the mild temperature are the ocean on the west and the Rocky Mountains on the east. The ocean's currents temper the heat and cold, while the mountains are as a barrier which deflects the cold and severe low temperature of the polar regions of the British Possessions on the north. Yet, with these modifying or tempering influences, there exists in the State a great variety of climates, yet all modified from what they would be were the physical conditions different.

Within the borders of the State can be found climates ranging from that of the sunny hillsides of Italy to that of the frosty regions of Minnesota, from the humid atmosphere of Alaska to the arid regions of California. The topographical features of the State produce the various climatic conditions. The air, ladened with moisture, passes from off the ocean, and meets its first obstruction, the Coast Range of mountains, on which and to the westward to the ocean the moisture is condensed and falls in the form of rain. The amount of rainfall along the coast varies from 58 to 75 inches; there being a greater amount in the northern and southern portions of the coast section than in the central section. The moisture which is not precipitated on and to the west of the Coast Range is carried across the Coast Range and distributed through what is locally called the Willamette, Umpqua, and Rogue River Valleys, valleys extending from the Columbia River to the California line. These are the interior valleys; and in them the moisture decreases from the north to the south, the average rainfall at Portland, in the north, being 49 inches annually, while at Ashland, on the south, it is but 21 inches annually. The moisture-laden winds, continuing on their eastern course, pass over the Cascade Mountains; and having deposited a large proportion of their moisture already, but little remains for the vast area east of the Cascade Mountains, termed Eastern Oregon. This section of the State has an elevation south of the Columbia River Valley of from two to six thousand feet, and has an average annual rainfall of from 10 to 15 inches. In the Columbia River Valley the annual rainfall varies from 14 to 20 inches. This brief résumé shows a decline in the amount of precipitation from the west to the east; and by comparing them with the thermal conditions, it will be found that the greater the precipitation the less the range in temperature, and the less the precipitation the greater the range.

The productiveness of a region depends more upon its exemption from great ranges in temperature and an average and almost constant amount of rainfall than upon any other conditions. The precipitation has been briefly outlined, and now we'll briefly speak of the distribution of temperature. Owing to the influence of the ocean, that portion of Oregon lying west of the Coast Range of mountains has a most constant and equable temperature. As a rule, a temperature of 32° is experienced every winter, while the extreme summer temperature is not quite 90°. Extreme temperatures as low as 10° above zero have been recorded, but such are very unusual, and of infrequent occurrence. To the east of the Coast Range and west of the Cascades — the great agricultural valleys of Oregon occupy this area — is found a greater range in temperature, though seldom more severe. Through the Willamette Valley the lowest

temperatures on record occurred in January, 1888, when the temperature fell from 2° to 6° below zero. In the Umpqua Valley at the same time it was 6° below zero, while at Ashland, in the Rogue River Valley, it was 3° below zero. In this connection, it may be well to state that these temperatures are the lowest known in the section mentioned, and that during the cold period in which these low temperatures were recorded in the valleys of Oregon, orange trees were frozen in Southern California about Los Angeles. Through the great plains and valleys of Oregon lying to the east of the Cascade Mountains, the minimum winter temperature is much lower, zero temperatures occurring every winter, and frequently the temperature falls to 10° and 15° below zero. The period of extreme cold is of comparatively short duration, though it is at times very severe. The maximum summer temperature in the valleys between the Coast and Cascade Range of mountains ranges usually between 75° and 90°, though the extreme is greater. In July, 1891 (the 23d), the highest temperature on record prevailed for a few hours. At Portland it was 102°; at points in the central portions of the Willamette Valley it was from 100° to 105°; in the Umpqua Valley it was 102°; in the Rogue River Valley it was from 103° to 108°. Reference to the tables of temperature herewith, it will be seen that it is seldom that temperatures above 95° are recorded. During the period of extreme heat in the western portions of the State the eastern portions had no such unusual temperature, though temperatures of from 90° to 100° occur every summer. The foregoing is briefly the extremes of temperature. In this report it is not intended to touch upon the mean temperatures, for from that one is not enabled to determine the practical variation in temperature, hence the possible soil productions. At this period it may be well to describe general atmospheric conditions during the prevalence of the extreme high temperatures. The sky is generally cloudless; the wind has a velocity of from 4 to 8 miles per hour; the air has a relative humidity of less than 40% saturation. It is this latter feature that prevents any harmful or especially injurious effects. The nights are always cool, no matter what may be the extreme day temperature; hence during a heated term, which never lasts over three days, the nights are cool, the minimum temperature being from 50° to 65°; the morning opens with a temperature at 9 o'clock of about 75° and a relative humidity of 70%. As the day advances the temperature rises and the relative humidity falls, until about 4 P. M. the temperature has risen to say 95°, while the relative humidity has fallen to about 20% saturation. The high temperature necessarily heats the body and the blood and causes perspiration to ooze from every pore. The healthful effects of the low relative humidity and the preventive for the debilitating results is shown by the fact that the dry air evaporates the moisture as it appears on the body, thus keeping the body much cooler than it otherwise would be. It is owing to the cool nights and low humidity that sunstroke and other evil effects of hot weather are unknown in Oregon. The low humidity allows of rapid evaporation from the vegetation as well as from the body, thus depriving the soil of much of its needed moisture. Here, again, Nature has supplied a great restorer in the dews of night, which greatly tend to restore the loss of moisture during the day. Through the humid and thickly settled portions of the East and South the cooling

effects produced by evaporation on the body are missing, which, together with the high night temperature, produce a continued heating of the blood, finally resulting in *coup de soleil*, or insolation, or what is called sunstroke.

Within the State of Oregon can be found many varieties of climate, each suited to some especial production, and each beneficial to some variety of disease. Pulmonary troubles find relief in various localities of the State lying to the east of the Cascade and Blue Mountains, while another variety of pulmonary disease may find relief along the Coast counties. In such cases the peculiar disease must seek its peculiar curative climate. Some sections of the State are beneficial to rheumatic and asthmatic troubles, while other sections are deleterious. A systematic course of investigation of climate and disease would furnish beneficial results, in Oregon, far surpassing the cash and labor of the work.

Sufficient investigation has already been pursued to show in a general way the climatic conditions of the State in general or as a whole, and the suitability of certain products to the climate. While nothing conclusive has been evolved, it can be said with a reasonable degree of certainty, that the following arrangement of products to the various climates is correct. The country west of the Coast Range of mountains is primarily a dairying section; this is owing to a generous amount of moisture, a mild temperature, resulting in continuous green and luxuriant grass. In many favored localities especially on the bays a few miles inland from the Ocean, Cranberry culture will prove to be a valuable industry. Cereals, hay, fruits, vegetables, and berries also grow to great perfection; while in the interior valleys of Curry County, figs, olives, and other semi-tropical products are successfully grown.

In the great Willamette Valley every product known to the temperate zone can be produced, successfully too. The valley is principally an agricultural storehouse of wealth. Fruits grow to perfection, especially prunes, pears, and apples, while root crops and vegetables are unexcelled in quantity produced as well as the quality. Stock, including horses, sheep, and swine, as well as cattle, have in the Willamette Valley a section especially suited to them. The wool, for example, is noted for its cleanliness, its length of staple, and strength of fiber, as well as for its weight per fleece.

The Umpqua and Rogue River Valleys are essentially fruit sections. In the latter, peaches are unexcelled; while in both, fruit of all varieties is at home in them. Prunes, pears, peaches, plums, grapes, berries, melons, and apples are preëminently adapted to the soil and climatic conditions. Owing to the light rainfall in sections of Josephine and Jackson Counties, irrigation is beneficial to the products, though it is not always necessary. Much better and larger products, singly and per acre, can be produced by irrigation. Generally speaking, irrigation is not necessary along the coast, or in the Willamette or Umpqua Valleys. To the east of the Cascade Mountains, there is a general climate, while locally there are great varieties; and as a result, great varieties in products. The country, as a whole, is a wheat and stock country. Locally, it can be divided somewhat as follows: Along the Columbia River Valley, where irrigation can be practiced,—in a few localities irrigation is not absolutely necessary,—peaches can be grown to perfection; so also can apricots,

melons, and berries. Grapes for table use, and possibly for wine, is a most profitable crop. Back from the valley, on the higher lands, the great wheat fields spread out in all directions; while farther removed, the stock ranges begin. In the interior country, cereals and stock, with a few varieties of fruit, are very successful. Along the river courses of Eastern Oregon fruit as a rule does well; but owing to the light rainfall, irrigation must be practiced for many products, especially south of the Blue Mountains. The elevation of this latter section ranges from 2,000 feet and upwards, making the seasons short and danger from frost very great.

Owing to the limited space available for this report on the climate of Oregon, it is necessary to curtail it, and only speak in general terms and of such marked characteristics as are of current interest, and which will furnish the most lucid information to the general reader, rather than a scientific report. With this end in view, only brief tables have been prepared, and only those from sections which represent the climatic conditions for their area or locality of the State.

Astoria data represents the general coast climate, though there are marked exceptions, as at Bandon, Coos County, where a marked uniform temperature prevails. Mr. George Bennett of Bandon has for many years kept a daily record of weather, which will be published in January, 1893, in the Second Biennial Report of the Oregon State Weather Service, which will show in detail the peculiar climate—equable as an island in the midst of the ocean, and extremely healthful. Reports covering a long series of observations from Eola, Albany, The Dalles, and other places of less length of record, in all about sixty points in Oregon, will be published in the report before mentioned, and to the reader of this in search of the climate more in detail, they are referred to that report, which can be had free of charge by addressing Weather Bureau, Portland, Oregon.

The data concerning Portland herewith gives in general the climate of the Willamette Valley; that of Roseburg, the Umpqua Valley; Ashland, the Rogue River Valley; The Dalles, the Columbia River Valley; La Grande, the Grand Ronde Valley, and Baker City, the plateau to the east and south of the Blue Mountains.

For the reader to form an idea of the average hourly temperature as it changes from hour to hour during the day, and from month to month, the following table is given for Portland, Oregon, for the year 1891. The data is obtained from a self-registering thermometer, and represents the average for the hour for each month. For example, January, under 0 to 1 A. M., 41°.6 is found; which is, that the average temperature from midnight to 1 A. M. for the month is 41°.6; and so on through the table. The mean hourly temperature for the year varies from 47°.5 from 4 to 5 A. M. to 59°.3 from 2 to 4 P. M. The coldest hour for any month is 33°.9—nearly 2° above the freezing point—from 5 to 6 A. M. in February. The mean for the months, found in the extreme right-hand column, varies from 36°.5 in February to 69°.2 in August. Examination of the table shows a wonderful small variation in the temperature, and one unusually free from marked and sudden changes.

AVERAGE HOURLY ATMOSPHERIC TEMPERATURE.

[*By Richards' Thermograph.*]

Months.	0 *to* 1 *A. M.*	1 *to* 2 *A. M.*	2 *to* 3 *A. M.*	3 *to* 4 *A. M.*	4 *to* 5 *A. M.*	5 *to* 6 *A. M.*	6 *to* 7 *A. M.*	7 *to* 8 *A. M.*	8 *to* 9 *A. M.*	9 *to* 10 *A. M.*	10 *to* 11 *A. M.*	11 *to* 12 *noon.*	12 *noon to* 1 *P. M.*
January	41.6	41.2	40.9	40.5	40.3	40.4	40.3	40.3	41.1	42.6	44.1	45.3	46.2
February	35.3	34.9	34.8	34.4	34.0	33.9	34.1	34.2	34.9	36.3	37.4	38.9	39.4
March	40.5	39.8	39.2	38.5	38.1	37.9	37.9	38.4	39.9	42.3	44.6	46.6	48.1
April	47.7	47.2	46.5	46.4	46.2	45.6	46.2	47.9	49.8	52.5	54.5	56.1	57.0
May	53.4	52.4	51.5	50.6	50.4	50.9	52.6	54.7	56.5	59.1	61.5	64.0	65.5
June	55.0	54.2	53.4	52.9	52.5	53.4	55.0	56.9	58.9	61.2	62.5	63.9	64.3
July	61.8	60.8	59.7	58.7	58.0	59.1	61.2	63.0	64.8	67.2	69.7	72.5	74.6
August	63.2	62.2	61.1	60.1	59.3	58.9	60.8	63.4	66.0	68.8	71.7	74.6	76.7
September	55.9	55.0	54.3	53.7	53.1	52.7	53.1	54.5	56.3	59.1	61.3	63.7	65.5
October	52.7	52.3	52.1	51.8	51.7	51.6	52.2	53.3	55.2	57.3	59.1	60.6	61.8
November	46.7	46.4	46.3	46.4	46.3	46.0	46.1	46.7	47.6	49.1	50.2	50.8	51.9
December	41.1	40.8	40.6	40.3	40.3	40.3	40.4	40.4	40.8	41.5	42.4	42.9	43.5
Sum	594.9	587.2	580.4	574.3	570.2	570.7	579.9	593.7	611.8	637.0	659.0	679.9	694.5
Mean	49.6	48.9	48.4	47.9	47.5	47.6	48.3	49.5	51.0	53.1	54.9	56.7	57.9

AVERAGE HOURLY ATMOSPHERIC TEMPERATURE—*Concluded.*

Months.	1 *to* 2 *P. M.*	2 *to* 3 *P. M.*	3 *to* 4 *P. M.*	4 *to* 5 *P. M.*	5 *to* 6 *P. M.*	6 *to* 7 *P. M.*	7 *to* 8 *P. M.*	8 *to* 9 *P. M.*	9 *to* 10 *P. M.*	10 *to* 11 *P. M.*	11 *to midnight.*	*For the month.*
January	47.0	47.4	47.2	45.9	45.3	44.2	43.6	43.1	42.6	42.1	41.9	43.1
February	40.0	40.0	39.9	38.8	37.8	37.1	36.4	36.0	35.9	35.7	35.5	36.5
March	49.4	49.8	50.2	49.6	48.3	46.6	45.5	44.5	43.0	42.2	41.3	43.4
April	57.6	57.3	56.9	56.6	55.4	54.3	52.8	52.2	50.1	49.2	48.4	51.4
May	57.0	68.0	68.3	68.4	67.0	65.3	61.9	59.5	57.5	56.2	54.6	59.0
June	64.9	65.5	65.2	65.4	64.6	63.4	61.6	59.9	58.0	57.0	55.8	59.4
July	77.1	78.0	79.1	78.5	77.5	75.6	71.5	68.8	66.7	65.1	63.1	68.0
August	78.5	79.5	80.1	80.4	78.5	75.5	72.0	70.0	68.1	66.2	64.2	69.2
September	67.2	67.7	68.0	67.0	65.2	63.2	61.2	59.9	59.0	57.8	56.5	59.6
October	63.0	62 8	62.5	61.6	59.0	57.7	56.5	55.6	54.7	54.0	53.2	56.3
November	52.1	51.8	50.8	50.3	49.4	48.7	48.1	47.7	47.4	47.0	46.9	48.4
December	43.6	43.8	43.6	43.2	42.2	42.2	41.6	41.4	41.3	41.3	41.4	41.7
Sum	707.4	711.6	711.8	705.7	690.2	673.8	652.7	638.6	624.3	613.8	602.8	636.0
Mean	59.0	59.3	59.3	58.8	57.5	56.2	54.4	53.2	52.0	51.2	50.2	53.0

To go still further into the details of Portland's climate, which represents a large proportion of Oregon's climate, it might be stated that during the year 1891 the temperature was below the freezing point during 153 hours on 33 different days, or there was a freezing temperature during 1.77% of the hours of the year. The temperature was above 90° during 33 hours of the year on 9 different days, or on three tenths of 1% of the hours of the year the temperature was above 90°. On July 23d the temperature was above 100° for 3 hours, the highest on record. Much has been said, and written too, outside of Ore-

gon, and inside too, by unknowing ones, of the rainfall of the State. In 1891 the rainfall was nearly the average, yet it fell on but 1,400 hours and 56 minutes at Portland, or rain fell during 16% of the hours of the year, the greatest in any month being 281 hours in December. Relative to the snowfall the following Portland data gives a fair idea of the amount in the western portion of the State: The unmelted snowfall for the year 1891 was 13.7 inches, divided as follows: February, 11.4 inches, and it fell on 11 days; March, 1.6 inches, and it fell on 2 days; December, 0.7 of an inch, which fell on the 25th. In 1890 the total snowfall was 35.7 inches, and falling on 13 days. In the eastern portion of the State the snowfall is heavier, frequently amounting to from 12 to 20 inches, and remaining on the ground from 10 days to 6 weeks. More snow falls about Ashland than at Portland, but less than in the eastern portion of the State; while along the coast seldom more than a few inches falls, frequently not that much; and it never remains, for the frost period extends over a mixed period, depending of course upon the location and elevation. Along the coast the frost period covers from November 1st to March 1st of each year. In the Willamette Valley the possible frost period is from October 15th to April 15th. In the Umpqua and Rogue River Valleys the frost period is from October 1st to May 1st. Along the Columbia River Valley it is about the same. East and south of the Blue Mountains the period of frost is greater. In some sections on the higher elevations frost occurs almost every month, while in other sections, of lower elevation, they do not occur during the period from May 15th to September 20th—sufficient time for vegetation to mature. Throughout the western portions of the State a non-frost period of six months can almost always be depended upon. A peculiar feature concerning frost is that in the spring and autumn, and frequently during winter, a clear frosty night is followed by a densely foggy morning, which being impregnated with moisture, dissolves the frost, and ere the sun dissolves the fog formation the frost has disappeared and no injurious effects result, for it is the rapid thawing after frosts that does the damage to vegetation rather than the frost itself. It frequently happens, too, that when the temperature sinks low enough to allow of frost to be formed, that the fog comes on and prevents the formation of frost, for the fog acts as a covering to the vegetation and protects it. If it were not for these fog formations, which begin about from 3 to 6 A. M. and continue to 8 or 9 A. M., when they rise, form a lower cloud until about 11 A. M., when the sky becomes clear, the fruit buds in the spring would be frequently and seriously injured.

Owing to the cool nights and usual high relative humidity at night, the electrical conditions of the atmosphere are kept more in equilibrium and prevents the formation of thunder storms and other severe atmospheric disturbances. Thunder is at times heard and lightning is sometimes seen, but they are so faint, and they are never severe, that it is generally said that thunder storms are unknown in Oregon. This is in part true—though not literally—yet do not occur with the frequency nor the violence that they do in the East. In Eastern Oregon thunder storms are more frequent than in the western portion of the State. They are more severe though neither so great as in the East. Those in Eastern Oregon are frequently accompanied with heavy downpours of rain, though seldom is the electrical disturbances severe.

Severe storms—*i. e.*, destructive to life and property—cyclones, tornadoes, and other great atmospheric disturbances—are unknown. This exemption is due to the equable thermal conditions, for without great and sudden changes in temperature, no severe disturbances are possible. The general velocity of the wind is much less through Oregon than obtains in the major portion of the world. The movement of the wind is greater during the summer afternoons, due to the sea breeze, than at any other period of the year, during which time the wind has a velocity of from 6 to 15 miles per hour. During the winter season the winds average a higher velocity, but save during the passage of a low area of barometric pressure, they do not obtain the extreme velocity. The average hourly velocity of the wind is from 3 to 5 miles in Western Oregon, and from 6 to 8 miles in Eastern Oregon. The general velocity of the wind through the United States ranges from 5 to 10 miles per hour. The prevailing direction of the wind is from October to April from the southerly quadrant, while from April to October they are northerly. Possibly the most healthful feature of the wind's movement is the daily sea and land breeze which prevails over the greater portion of the State for the major portion of the year, which give a healthful and invigorating atmosphere to the human being, at the same time tempering the heat and cold and making the Oregon climate equalled by few and surpassed by none—surpassed by none, when the healthfulness of the people, the productiveness of the soil, and luxurious vegetation are considered.

The seasons in Oregon are distinguished as the wet and dry seasons, more than by the usual designation of winter, spring, summer, and autumn. The wet season is not, as is usually understood to be, wet or rainy all of the time, nor does the dry season indicate absolute dryness; but rather during the wet season about 75% of the annual precipitation occurs, while during the dry season the remainder occurs in the shape of infrequent showers. The period allotted to the dry season extend from May 1st to October 15th. Usually there are a few showers during September, and they become more and more frequent until the rains set in about November 15th, from which date to March 15th rains are expected on about four days out of six. From March 15th to May 1st the showers at intervals occur as in October.

In the Willamette Valley—nearly seven million acres—a failure of crops is unknown, due to the fulsome supply of moisture during the year. In the Umpqua and Rogue River Valleys and in Eastern Oregon, cereal crops are often reduced in amount of bushels per acre, due to a falling off of the normal amount of precipitation. Another feature to be noted. What is known as "winter kill" in fruit time and "freezing out" of fall-sown grain, is unknown in the western portion of the State and parts of the Columbia River Valley. The atmosphere is usually very clear, and the air is invigorating, though during the month of September the air is frequently filled with dense smoke, caused by the forest fires, burning of slashings, brush, etc. The smoke hangs, as it were, in the atmosphere, until the first good rain, when the atmosphere is cleared and it resumes its accustomed clearness.

The following table gives a general comparison of climatic conditions, which cannot but show the superiority of Oregon's climate over that of other

States. As a fair sample, the data is given for the year 1889, except for the three columns on the right, which are computed from a series of years of observation. The year 1889 was taken, as it is the latest published data for the places named. The maximum temperature for the year 1889 at the Oregon stations compares very favorably with those in other States. The high temperatures in Oregon occur with low relative humidity, which is not the case along the Gulf, Atlantic, and Lake Coasts. The minimum temperatures in Oregon stand out very favorably when compared with the others. The rainfall is especially prominent, for save in the truly semi-arid regions it is much less than at the majority of places. The number of days on which precipitation occurred is also favorable to the Oregon station. And so on through the various subjects under comparison. The table is absolutely correct, very comprehensive, and a subject for careful study and investigation.

COMPARATIVE CLIMATIC DATA.

Place.	1889.				Highest maximum on record.	Lowest minimum on record.*	Average velocity of wind—six years' record—in miles and tenths per hr.
	Maximum.	Minimum.*	Total precipitation	No. of days of precipitation.			
Portland, Oregon	96	23	31.76	136	102	— 2	4.9
Astoria, Oregon	88	25	65.03	159	88	10	------
Roseburg, Oregon	97	22	28.12	121	102	— 6	3.0
Baker City, Oregon †	101	—14	12.50	92	101	—25	------
Olympia, Washington	90	20	33.75	145	98	— 2	------
Spokane Falls, Washington	96	—10	14.27	97	102	—10	4.2
Sacramento, California	101	31	27.48	77	108	19	------
Tuma, Arizona	117	34	4.69	22	118	22	------
San Antonio, Texas	98	28	38.96	106	103	6	------
New Orleans, Louisiana	95	32	48.45	107	97	15	7.3
Charleston, South Carolina	97	26	52.15	105	105	10	------
Lynchburg, Virginia	96	7	60.58	154	102	—12	3.8
Washington, District of Columbia	93	4	61.33	153	104	—14	5.4
Philadelphia, Pennsylvania	94	2	50.60	160	102	— 5	9.7
New York City, New York	90	2	58.68	152	100	— 6	9.3
Boston, Massachusetts	91	— 1	39.82	131	102	—13	11.2
Portland, Maine	92	— 8	41.92	128	97	—15	------
Cleveland, Ohio	92	— 7	32.57	146	99	—17	9.1
Louisville, Kentucky	93	6	35.02	131	105	—10	7.4
St. Louis, Missouri	93	0	33.16	95	103	—22	------
Chicago, Illinois	90	—11	31.95	117	100	—20	9.0
Duluth, Minnesota	86	—30	32.04	119	99	—41	7.8
Des Moines, Iowa	93	—13	25.90	84	101	—30	------
Wichita, Kansas	96	— 2	31.67	91	102	—20	------
Omaha, Nebraska	94	—10	22.97	80	105	—32	8.0
Denver, Colorado	100	— 7	14.75	90	105	—29	7.0
Bismarck, North Dakota	102	—34	11.03	72	105	—41	8.4
Salt Lake City, Utah	102	5	18.46	91	102	—20	5.2

* Figures preceded by the minus (—) sign indicate temperatures below zero. † Record for 1890.

The following tables of mean temperature and average precipitation are submitted with this report for general information. The data collected by the Oregon Weather Bureau is thus condensed, it being deemed that short, concise statements in this report will be more valuable to the reader than a mass of statistics.

TEMPERATURE TABLE.

Statement showing the mean monthly and the annual mean temperature at places in Oregon. Recorded in degrees and tenths, Fahrenheit scale.

District, Station, County.	No. of years recorded.		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Average Annual.
COAST.	Yrs.	Mos.													
Fort Canby, Pacific county (Wash.)	23	0	40.7	42.0	45.5	49.4	51.1	57.3	60.0	59.9	57.8	53.7	48.2	44.2	51.0
Fort Stevens, Clatsop county	15	2	39.7	41.5	45.0	49.1	53.3	57.3	59.8	59.6	57.7	52.4	46.0	42.0	50.3
Astoria, Clatsop county	28	8	38.7	41.3	44.5	48.7	53.1	57.2	60.1	58.9	54.8	53.1	46.7	41.1	49.8
Tillamook, Tillamook county	1	2	35.7	39 1	43.5	51.0	55.8	59.3	61.3	53.4	57.0	51.0	48.5	39.0	49.8
Newport, Benton county	2	9	42.5	44.9	46.9	50.9	55.5	60.2	60.2	60.1	55.9	54.6	47.0	47.8	52.2
Block House, Benton county	5	0	39.4	42.8	43.4	46.9	52.1	58.6	60.6	61.8	59.3	52.2	44.9	40.5	50.2
Fort Umpqua, Douglas county	5	10	44.2	46.1	48.1	50.7	54.5	59.5	59.9	59.7	58.9	54.1	49.2	45.5	52.5
Gardiner, Douglas county	1	0	38.9	41.9	46.8	49.3	56.8	58.8	60.0	60.6	58.1	54.2	49.4	38.4	51.1
Bandon, Coos county	17	3	44.7	45.3	47.8	50.1	53.7	56.8	58.1	58.1	56.1	52.9	49.0	47.5	51.7
Port Orford, Curry county	4	0	47.2	47.6	51.1	50.7	54.8	58.6	59.1	60.4	57.5	55.8	49.9	49.2	53.5
WILLAMETTE VALLEY.															
Vancouver Barracks, Clarke county (Wash.)	19	4	36.5	40.2	44.8	51.8	58.5	62.8	66.4	66.4	61.1	52.8	44.9	37.4	42.0
Vernonia, Columbia county	1	3	31.1	33.7	43.7	47.2	55.8	57.5	60.1	61.5	56.8	50.7	44.3	36.4	48.2
Portland, Multnomah county	21	11	38.9	41.6	47.1	52.0	57.4	62.8	67.0	66.0	61.2	53.3	45.8	43.2	53.0
East Portland, Multnomah county	6	5	35.8	39.3	47.7	51.2	59.6	64.4	66.6	66.0	61.0	53.8	43.5	38.1	52.2
McMinnville, Yamhill county	2	6	34.6	39.5	46.0	51.2	57 2	59.0	62.3	64.4	60.4	52.5	44.2	39.9	50.1
Fort Yamhill, Yamhill county	9	7	37.1	39.6	43.6	47.8	53.5	57.0	60.9	61.2	58.1	57.2	43.5	38.2	49.3
Oregon City, Clackamas county	3	0	38.6	42.0	45.2	55.9	60.9	66.3	72.0	71.6	60.2	55.8	47.2	39 1	54.6
Mt. Angel, Marion county	2	11	38 2	38.8	48.4	51.3	58.4	63.6	68.3	67.3	62 5	52.6	43.8	42.9	53.0
Salem, Marion county	1	1	41.3	49.2	46.5	49 5	58.4	64.5	67.1	69.3	65.2	60.0	58.2	50.3	56.6
Eola, Polk county	20	11	37.0	39.6	45.7	49.5	54.1	59.7	64.7	64.8	59.9	51.5	52.9	39.5	50.7
Fort Hoskins, Polk county	8	4	38.8	41.6	44.9	50.4	55 0	60.4	63.6	64.2	59.8	52.3	45.1	40.4	51.4
Albany, Linn county	12	8	37.3	40.6	46.5	51.8	57.8	61.7	66.1	66.1	60.7	52.0	44.0	41.7	52.2
Corvallis, Benton county	1	4	33.9	37.7	46.0	51.4	57.4	63.7	67.4	64.9	------	50.4	41.5	38 8	50.6
Creswell, Lane county	1	3	36.6	38.6	47.4	52.0	56 6	65.7	70.4	70.8	62.0	56.1	45.6	39.2	53.4
UMPQUA VALLEY.															
Roseburg, Douglas county	13	5	40.1	42.2	47.9	51.6	56.8	61.5	66.3	65 7	61.2	58.3	44.9	42.3	53.2
ROGUE RIVER VALLEY.															
Grants Pass, Josephine county	1	8	32.2	39.2	46.3	53.2	59.6	65.2	73.5	67.6	59 0	50.4	42.6	37.2	52.2
Jacksonville, Jackson county	1	7	------	35.2	43.3	53.1	59.6	65.7	71.6	66 4	62 8	52.2	45.0	36.2	49.3
Ashland, Jackson county	6	11	37.6	41.3	47.3	51.5	60.7	64.5	70.9	69.4	63.2	54.1	44.6	40.8	53.8
Siskiyou, Jackson county	1	11	32.0	37.9	44.4	51.3	57 0	64.2	70.7	67.3	63.4	53.1	47.4	36.4	52.1
UPPER COLUMBIA RIVER BASIN AND EASTERN OR.															
Hood River, Wasco county	1	3	22.8	32.2	43.2	53.2	63.4	63.7	69.6	70.4	62.4	54.0	43.6	33.8	51.0
The Dalles, Wasco county	15	11	28.5	35.9	46.6	54.9	61.2	61.8	70.0	73 0	62.8	50.8	40.9	34.5	51.7
Fort Dalles, Wasco county	13	4	31.5	38.1	45.9	53.4	61.2	67.1	73.7	72.5	63.8	54.3	42.4	33.6	53.1
Lone Rock, Gilliam county	1	1	21.8	27.2	38.7	46.8	55.2	55.4	61.8	63.3	58.0	45.4	40.8	28.6	45.2
Heppner, Morrow county	1	6	23.3	30.0	41.2	51.4	58.0	64.5	71.4	67.7	59.7	51.5	42.6	31.3	49.4
Umatilla, Umatilla county	5	9	32.1	33.4	47.1	53.0	58.6	67.2	72.6	72.1	63.5	52.8	43.1	34.1	52.5
Pendleton, Umatilla county	1	1	21.0	30.1	42.0	52.2	60.1	63.0	68.8	68.8	60.0	49.6	41.2	31.7	49.0
Walla Walla, Walla Walla county (Wash.)	7	2	30.1	38.4	48.4	55.2	62.3	67.1	74.9	73.8	63.8	52.6	41.5	37.3	53.7
Fort Walla Walla, Walla Walla county (Wash.)	14	6	32.4	37.8	44.3	52.5	61.8	70.0	77.6	75.0	65.2	54.6	41.6	35.1	54.0
Joseph, Wallowa county	1	0	16.0	22.9	31.2	44.0	52.9	53.4	63.5	------	56.8	42.2	35.1	23.2	40.1

TEMPERATURE TABLE—*Concluded.*

Statement showing the mean monthly and the annual mean temperature at places in Oregon. Recorded in degrees and tenths, Fahrenheit scale.

District, Station, County.	*No. of years recorded.*		*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Average annual.*
UPPER COLUMBIA RIVER BASIN AND EASTERN OR.	*Yrs.*	*Mos.*													
La Grande, Union county	3	9	22.7	30.9	40.9	48.9	56.2	59.8	70.3	68.8	60.0	49.6	41.4	31.8	48.4
Baker City, Baker county	1	5	16.2	27.7	37.6	47.2	54.6	56.2	64.0	65.2	56.8	48.3	37.0	26.1	44.7
Boise City, Ada county (Idaho)	12	10	27.4	34.7	43.9	53.2	58.1	65.7	73.0	72.1	60.8	49.4	40.8	33.0	51.0
Camp Three Forks, Malheur county	2	0	22.8	29.9	37.1	43.8	53.0	63.0	70.0	71.2	61.6	52.6	41.7	31.1	48.2
Benlah, Malheur county	1	3	14.2	29.0	37.5	47.6	56.2	56.6	65.0	62.8	58.3	48.4	35.6	25.8	44.7
Camp Harney, Harney county	11	8	25.0	29.1	36.3	44.5	51.8	63.9	71.2	68.9	60.1	48.1	35.9	28.7	47.0
Camp Watson, Grant county	2	4	23.4	28.1	36.1	43.6	49.6	57.4	63.0	66.1	56.6	41.0	37.6	33.2	44.9
LAKE REGION.															
Linkville, Klamath county	5	9	29.9	31.6	41.7	48.3	54.7	58.8	66.0	65.8	58.8	48.4	39.0	34.6	48.3
Fort Klamath, Klamath county	19	7	25.3	28.3	33.3	41.4	48.8	55.9	61.9	60.2	52.6	43.3	35.1	29.2	42.9
Camp Warner, Lake county	6	8	28.9	29.9	34.6	40.5	49.6	59.2	68.1	65.2	57.0	47.5	37.4	30.1	45.7
Lakeview, Lake county	4	11	29.0	31.8	39.6	45.3	51.9	57.5	67.0	66.8	58.2	49.9	39.6	33.3	47.5

PRECIPITATION TABLE.

Statement showing the average monthly and annual precipitation, the number of years' record from which the averages are computed for the various stations in the county and district named. The precipitation includes rain, melted snow, sleet, and hail, and is expressed in inches and hundredths. Stations having less than one year's record are not given. The table covers averages of from one to thirty-one years' record.

District, Station, County.	*No. of years recorded.*		*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Average Annual.*
COAST.	*Yrs.*	*Mos.*													
Fort Canby, Pacific county (Wash.)	23	10	9.90	8.24	8.31	4.45	2.98	2.34	1.75	1.18	2.95	5.65	8.61	10.36	66.67
Fort Stevens, Clatsop county	15	1	11.35	10.67	10.92	4.72	3.59	3.09	2.08	1.83	2.90	7.21	11.75	11.85	81.96
Astoria, Clatsop county	31	4	12.85	8.51	8.91	5.18	3.56	3.03	1.25	1.45	3.24	5.21	10.21	12 09	75.49
Tillamook, Tillamook county	1	5	17.37	9.27	7.17	5.34	5.32	3.26	0.14	1.75	3.76	6.40	6.23	10.24	76.25
Newport, Benton county	1	3	13.66	2.94	7.76	2.50	1.34	6.82	1.34	0.00	2.40	2.26	6.06	17.90	64.98
Block House, Benton county	4	2	10.73	11.01	14.60	4.91	5.21	1.97	0.88	1.24	6.92	7.76	12.45	11.30	88.98
Fort Umpqua, Douglas county	5	10	10.28	9.91	9.72	4.00	3.09	2.18	0.30	0.38	2.27	3.66	9.70	11.86	67.35
Gardiner, Douglas county	4	00	11.33	10.90	8.12	4.20	3.39	2.18	1.36	0.70	1.46	6.48	5.40	15.40	70.92
Empire City, Coos county	5	10	6.31	7.41	8.11	2.94	1.00	1.28	0.42	0.24	1.24	3.00	4.02	7.25	38 82
Bandon, Coos county	12	11	11.92	8.82	6.96	4.35	3.13	1.61	0.62	0.46	1.79	4.94	4.14	11.38	60.12
Gold Beach, Curry county	1	1	31.84	23.68	14.44	2.98	1.01	2.69	0.32	0.00	0.11	8.23	3.43	17.25	105.88
Port Orford, Curry county	2	10	9.08	5.79	6.17	7.53	4.56	1.33	0.56	1.22	2.34	7.31	10.27	14.43	70.59
WILLAMETTE VALLEY.															
Vancouver Barracks, Clarke county (Wash.)	19	00	6.23	3.54	3.82	2.43	2.28	1.88	1.22	0.50	1.55	2.50	4.81	7.05	37.81
Vernonia, Columbia county	1	00	15.27	10.01	4.40	2.78	1.00	2.66	0.58	0.33	0.09	3.76	0.63	8.47	50.03
Portland, Multnomah county	21	9	7.38	6.60	6.20	3.12	2.49	1.65	0.61	0.60	1.66	3.97	5.95	8.25	48.28
East Portland, Multnomah county	6	11	5.24	4.39	2.11	1.82	1.20	1.86	0.33	0.15	1.31	2.80	2.91	5.37	29.52
McMinnville, Yamhill county	2	6	9.36	8.23	3.93	2.22	0.86	3.97	0.64	0.12	1.12	3.91	3.02	4.93	37.01

PRECIPITATION TABLE—*Concluded.*

District, Station, County.	*No. of years recorded.*		*Jan.*	*Feb.*	*Mar.*	*April.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Average Annual.*
WILLAMETTE VALLEY.	*Yrs.*	*Mos.*													
Fort Yamhill, Yamhill county	9	6	9.51	7.30	7.66	2.99	2.44	1.61	0.36	0.42	2.69	2.96	7.55	10.08	55.57
Oregon City, Clackamas county	3	00	7.93	5.17	7.15	1.92	3.37	1.41	0.15	0.94	2.24	3.46	5.12	8.75	47.61
Mt. Angel, Marion county	5	5	9.09	4.06	5.27	4.38	2.89	2.30	1.21	0.33	1.45	3.93	3.21	9.76	48.88
Fort Hoskins, Polk county	7	9	12.47	9.34	8.44	2.89	2.85	1.69	0.39	0.36	3.24	3.90	8.58	11.37	66.52
Eola, Polk county	20	11	6.16	5.91	5.19	2.65	1.90	1.27	0.43	0.38	1.62	3.06	4.76	6.10	39.34
Albany, Linn county	13	5	8.68	6.36	4.60	3.40	2.52	1.56	0.53	0.51	1.74	3.44	3.97	8.39	45.72
Corvallis, Benton county	1	5	10.62	8.88	5.67	2.68	1.73	1.90	0.53	0.14	T.	1.65	1.60	6.44	41.84
Eugene, Lane county	3	1	8.74	5.61	6.11	2.27	3.61	5.44	0.47	0.64	1.89	2.27	5.91	4.11	42.77
Creswell, Lane county	1	5	14.51	9.75	6.72	3.23	4.18	3.24	0.34	0.54	1.33	5.57	5.58	6 94	61.93
UMPQUA VALLEY.															
Roseburg, Douglas county	13	5	6.64	4.61	3.28	2.63	1.76	0.94	0.51	0.27	0.78	2.76	3.58	6.41	34.17
ROGUE RIVER VALLEY.															
Grants Pass, Josephine county	1	9	13.88	10.12	4.01	1.28	1.68	1.10	T.	0.11	0.63	2.08	2.96	6.97	44.67
Jacksonville, Jackson county	6	11	2.85	4.24	2.22	0.91	1.71	0.27	0.00	0.38	0.90	1.10	2.02	5.82	22.42
Ashland, Jackson county	11	11	3.44	2.22	1.81	1.72	1.62	1.04	0.65	0.20	0.61	1.56	1.90	3.49	20.26
Siskiyou, Jackson county	1	10	7.10	7.30	4.52	0.86	3.26	0.18	0.42	0.00	0.15	3.13	1.95	4.80	33.67
UPPER COLUMBIA RIVER BASIN AND EASTERN OR.															
Cascade Locks, Wasco county	11	9	13.87	10.58	7.82	5.94	3.66	2.91	1.11	0.72	3.59	8.29	8.06	14.16	75.73
Hood River, Wasco county	1	3	6.98	8.10	3.14	0.93	0.19	0.47	0.16	0.08	0.70	2.18	1.58	2.16	26.67
The Dalles, Wasco county	15	11	3.10	2.22	1.42	0.72	0.61	0.62	0.14	0.18	0.43	1.39	1.76	3.25	15.84
Fort Dalles	13	00	4.52	2.42	2.23	0.74	0.94	0.57	0.34	0.27	1.47	0.97	3.35	4.24	22.06
Lone Rock, Gilliam county	4	8	1.11	1.03	1.28	0.99	1.52	1.85	0.46	0.55	0.29	0.67	0.71	1.70	12.16
Heppner, Morrow county	1	6	1.13	1.38	2.75	0.39	0.71	1.46	0.07	0.14	0.50	1.04	0.33	1.25	11.15
Umatilla, Umatilla county	5	8	1.40	1.14	0.89	0.82	0.64	0.36	0.32	0.34	0.78	0.88	0.03	1.31	9.81
Pendleton, Umatilla county	1	5	1.19	1.14	1.36	0.40	1.28	1.80	0.08	0.07	0.27	0.63	0.21	1.71	10.14
Walla Walla, Walla Walla county (Wash.)	25	11	2.11	1.94	1.51	1.29	2.09	1.31	0.41	0.30	0.90	1.56	1.81	2.71	17.94
La Grande, Union county	3	11	3.12	1.67	1.90	1.26	2.47	2.10	0.40	0.20	0.40	1.36	1.08	3.08	19.01
Telocaset, Union county	1	3	2.22	2.21	1.90	0.44	2.41	2.83	0.38	0.37	0.38	1.20	0.58	1.20	16.15
North Powder, Union county	1	1	2.05	2.04	0.66	0.11	1.91	1.51	0.03	0.22	0.00	0.23	0.28	1.10	10.17
Joseph, Wallowa county	1	1	1.41	4.96	1.75	1.95	1.62	3.21	0.17	0.00	0.07	1.97	0.45	1.92	19.48
Baker City, Baker county	1	5	1.55	2.08	1.99	0.56	1.33	2.07	T.	0.12	0.70	1.24	0.54	1.41	13.42
Boise City, Ada county, Idaho	13	00	2.35	1.56	1.19	2.05	1.12	0.97	0.20	0.10	0.48	1.31	0.75	2.21	14.30
Beulah, Malheur county	1	3	2.93	2.08	2.12	0.37	0.52	0.35	T.	0.07	0.18	0.56	0.50	1.92	11.60
Camp Harney, Harney county	11	8	1.51	1.11	1.31	0.98	0.88	0.76	0.35	0.21	0.23	0.49	1.45	1.58	10.87
Camp Watson, Grant county	1	9	0.93	0.86	1.35	1.39	1.21	1.94	0.11	0.00	0.62	0.28	0.78	3.12	13.12
LAKE REGION.															
Linkville, Klamath county	5	9	2.26	1.32	1.53	1.64	1.51	1.44	0.50	0.08	0.41	1.16	1.34	2.09	16.40
Fort Klamath, Klamath county	17	6	3.75	2.61	2.76	1.35	1.36	0.89	0.46	0.28	0.55	1.60	3.20	3.67	22.39
Parkers, Klamath county	1	7	1.17	0.48	4.91	1.32	2.23	2.48	0.45	0.06	0.44	2.72	2.34	1.64	20.27
Camp Warner, Lake county	5	3	1.61	1.98	1.21	1.21	1.89	0.64	0.28	0.19	0.60	0.23	1.70	2.89	14.43
Lakeview, Lake county	5	6	2.64	1.97	1.58	1.28	1.56	2.38	0.42	0.43	0.44	0.75	1.58	1.94	17.74

"T." indicates trace or sprinkle.

Maximum Temperature.

The following statement of maximum temperatures is taken to represent thoroughly, though very briefly, the general maximum temperatures of the State. The data is recorded in degrees, Fahr. scale, and are readily comparable, for all data was obtained from standard Government instruments. The data from Astoria, Portland, Roseburg, and Baker City is entirely from the records of Government officers. The data from The Dalles is from the records of Mr. Samuel L. Brooks, Voluntary Observer, U. S. Weather Bureau, a most careful and enthusiastic observer. The record of the maximum and minimum temperatures cover but a few years, in this report, but more extended data will appear in the Biennial Report of the Oregon Weather Bureau, to be issued in January, 1893. The data from La Grande is from the record made by Mr. J. K. Romig, Voluntary Observer, U. S. Weather Bureau. The data from Ashland and Lakeview is from U. S. Weather Bureau records up to 1890; since then, Mr. F. H. Carter, at Ashland, and Mr. A. T. Beach, at Lakeview, have continued the observations. The records of Mr. Romig, Mr. Carter, and Mr. Beach are thoroughly accurate, and are made by U. S. Government standard instruments; hence comparable with any records made in the United States.

ASTORIA, CLATSOP COUNTY,

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Max. for Year.
1884	------	------	------	------	------	------	------	------	------	------	------	52	------
1885	58	56	67	71	75	71	83	74	72	75	62	56	83
1886	55	62	56	65	72	69	81	80	84	67	57	59	84
1887	55	------	66	61	86	84	75	77	80	71	60	55	86
1888	60	54	64	66	77	75	88	74	80	68	58	55	88
1889	56	60	72	68	82	88	84	77	87	73	63	52	88
1890	50	53	59	68	76	76	76	83	76	65	64	50	83
1891	56	50	56	68	72	72	88	82	82	73	66	52	88
1892	54	58	64	67	79	81	74	------	------	------	------	------	------
Maximum each month	60	62	72	71	86	88	88	83	87	75	66	02	

ASHLAND, JACKSON COUNTY.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Max. for Year.
1884	------	70	------	------	93	91	100	106	90	80	78	58	106
1885	------	69	79	84	93	88	108	98	90	93	66	60	108
1886	66	71	72	77	90	94	99	97	98	83	69	63	99
1887	58	69	80	83	101	103	103	94	94	87	78	58	103
1888	59	69	75	87	92	88	101	98	102	84	72	65	102
1889	62	71	79	84	93	101	101	91	95	87	------	53	101
1890	48	53	62	------	88	99	98	95	94	76	74	58	99
1891	67	57	65	76	87	94	102	101	94	84	74	61	102
1892	59	61	79	70	89	99	------	------	------	------	------	------	------
Maximum each month	67	71	80	87	101	103	108	106	102	93	78	65	

PORTLAND, MULTNOMAH COUNTY, OREGON.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Max. for Year.
1871	------	------	------	------	------	------	------	------	------	------	------	------	------
1872	------	------	------	------	------	------	------	------	------	------	------	------	------
1873	------	------	------	------	------	------	------	------	------	------	------	------	------
1874	------	------	------	------	------	------	------	------	------	------	------	------	------
1875	53	54	55	83	75	82	96	88	86	78	63	63	96
1876	58	59	59	67	82	99	90	84	90	79	63	56	99
1877	58	62	68	78	79	86	91	89	88	73	62	62	91
1878	55	58	69	74	86	87	85	87	86	70	62	59	97
1879	52	60	74	77	82	82	92	87	85	68	61	58	92
1880	57	52	58	85	76	90	92	88	80	74	64	63	92
1881	57	63	76	80	82	85	90	85	84	64	58	58	90
1882	55	52	70	78	85	94	95	91	85	67	60	60	95
1883	56	60	75	74	84	87	94	80	87	64	60	56	94
1884	59	65	67	80	90	89	84	94	72	72	63	55	94
1885	55	59	72	82	94	86	99	91	82	82	65	59	99
1886	60	65	79	74	89	95	94	90	76	76	58	65	95
1887	58	63	75	69	99	95	93	90	75	75	68	57	99
1888	62	61	68	84	91	87	97	92	82	82	58	59	97
1889	55	64	78	77	88	94	96	87	80	80	64	53	96
1890	55	60	66	85	87	92	95	96	72	72	73	57	96
1891	61	48	60	72	84	87	102	97	83	83	68	58	102
1892	58	60	76	76	93	94	------	------	------	------	------	------	------
Maximum each month	61	65	79	85	99	99	102	97	93	83	73	65	------

THE DALLES, WASCO COUNTY.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Max. for Year.
1889	------	------	------	83	91	95	98	93	86	76	60	50	98
1890	48	55	62	------	------	98	------	94	87	66	64	61	98
1891	55	47	64	76	92	89	100	98	88	80	64	53	100
1892	51	60	71	73	89	102	------	------	------	------	------	------	------
Maximum each month	55	60	71	83	92	102	100	98	88	80	64	61	------

ROSEBURG, DOUGLAS COUNTY.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Max. for Year.
1877	------	------	------	------	------	------	96	90	90	76	65	63	------
1878	65	65	71	76	84	96	84	88	88	74	66	62	96
1879	56	66	75	75	82	84	96	92	90	72	60	56	96
1880	56	52	62	81	82	91	97	90	88	76	65	65	97
1881	57	63	80	78	84	83	91	88	89	63	58	63	91
1882	53	58	75	80	86	95	96	94	87	67	61	62	96
1883	59	69	80	71	84	87	93	86	86	65	59	57	93
1884	63	68	67	78	88	84	86	97	------	76	70	62	97
1885	66	67	75	82	89	85	101	92	90	91	67	61	101
1886	62	72	74	74	89	87	100	94	96	82	63	66	100
1887	58	70	81	77	102	97	93	89	95	82	69	58	102
1888	71	67	71	84	93	86	100	93	99	83	62	66	100
1889	59	68	80	76	87	95	97	90	90	82	64	57	97
1890	57	61	69	86	86	96	93	95	89	77	72	62	96
1891	61	51	66	76	82	89	102	99	91	87	74	66	102
1891	63	62	77	72	90	96	89	------	------	------	------	------	------
Maximum each month	71	72	81	86	102	97	102	99	99	91	74	66	------

LA GRANDE, UNION COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Max. for Year.
1886	------	------	------	------	------	------	102	97	89	80	------	51	102
1887	45	46	66	76	90	86	88	89	82	77	66	49	90
1888	50	56	64	81	87	81	94	------	------	------	------	------	94
1889	------	------	------	79	83	90	95	92	84	84	56	46	95
1890	48	55	61	85	87	92	99	93	90	70	68	55	99
1891	46	49	54	78	85	84	96	96	90	80	67	51	96
1892	48	52	65	------	80	90	------	------	------	------	------	------	------
Maximum each month	50	56	66	85	90	92	102	97	90	84	68	55	------

BAKER CITY, BAKER COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1889	------	------	------	------	------	------	95	95	83	85	56	49	------
1890	45	51	59	81	85	92	101	93	89	70	65	52	101
1891	44	48	53	77	81	85	98	96	90	77	63	44	98
1892	39	47	61	60	83	97	100	------	------	------	------	------	------
Maximum each month	45	51	61	81	85	97	101	96	90	85	65	52	------

LAKEVIEW, LAKE COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	39	48	50	63	------	82	86	90	76	70	65	60	90
1885	50	------	66	76	83	------	97	101	96	95	71	56	102
1886	57	72	73	74	82	90	95	92	88	75	63	53	95
1887	51	48	65	76	92	92	93	90	------	76	74	48	93
1888	50	------	------	82	87	82	------	------	94	83	------	------	94
1889	------	------	------	------	------	------	------	------	------	------	------	------	------
1890	------	------	------	------	------	76	97	99	92	81	75	57	99
1891	52	46	58	74	81	89	96	102	100	89	68	55	102
1892	48	54	71	73	90	100	------	------	------	------	------	------	------
Maximum each month	57	72	73	82	92	100	97	102	100	95	75	60	------

Minimum Temperatures.

The following statement shows the minimum temperatures, at places named, which represents the various localities of Oregon, recorded in degrees, Fahrenheit's scale. Figures preceded by the minus (—) sign indicate tempera- below zero, Fahr. scale:

ASTORIA, CLATSOP COUNTY.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Min. for year.
1884												10	10
1885	27	34	36	35	42	43	51	51	49	42	36	30	27
1886	20	35	30	34	35	47	47	51	47	40	33	39	20
1887	33		30	35	36	46	44	48	47	42	30	32	30
1888	10	32	28	36	46	50	48	54	49	41	35	34	10
1889	30	25	38	40	45	46	52	50	41	44	35	30	25
1890	21	16	32	32	40	45	50	50	42	38	35	34	16
1891	31	29	27	34	38	42	46	52	45	46	37	30	27
1892	32	31	35	33	40	44	47						
Minimum each month.	10	16	27	32	35	42	44	48	41	38	30	10	

PORTLAND, MULTNOMAH COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1875	3	24	34	23	40	39	46	46	44	36	28	33	3
1876	20	32	33	33	36	45	49	43	44	42	34	24	20
1877	27	25	31	35	38	44	47	48	39	31	32	25	25
1878	18	33	31	32	33	44	49	47	43	33	32	23	18
1879	20	25	33	36	41	44	48	50	44	37	25	3	3
1880	26	26	26	33	35	42	46	46	42	34	22	19	19
1881	24	26	31	40	40	45	46	46	40	32	29	29	24
1882	28	18	29	31	36	48	47	44	39	37	28	31	18
1883	8	7	34	36	40	44	48	44	45	37	34	24	7
1884	25	7	28	40	40	47	48	51	45	36	34	12	7
1885	17	32	33	35	40	42	49	48	41	34	34	27	17
1886	15	31	30	36	36	46	50	48	44	34	26	30	15
1887	29	9	31	31	34	44	46	45	40	33	25	29	9
1888	—2	30	24	32	38	48	46	52	44	37	31	31	— 2
1889	24	23	35	33	42	43	46	46	38	38	32	25	23
1890	12	10	24	32	40	45	48	48	40	35	30	28	10
1891	25	25	23	37	39	42	50	51	39	40	34	28	23
1892	26	27	36	33	39	42							
Minimum each month.	—2	7	23	28	34	39	46	43	38	31	22	3	

LAKEVIEW, LAKE COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	—10	—22	15	20	25	33	38	38	30	23	24	—13	—23
1885	8		25	23	26		40	46	31	27	21	5	5
1886	— 2	21	14	24	22	32	30	24	28	20	12	16	— 2
1887	2	— 6	26	18	20	31	42	41		25	12	13	— 6
1888	—24			26	26	34			41	26			—24
1889													
1890						29	42	40	39	23	20	16	16
1891	— 2	— 4	9	25	25	29	32	33	24	19	15	—11	—11
1892	— 2	4	22	14	26	28							
Minimum each month.	—24	—22	9	14	20	28	30	24	24	19	12	—13	

THE DALLES, WASCO COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1889	------	------	------	31	31	47	48	42	35	32	21	14	14
1890	—12	— 2	27	------	------	43	------	47	36	31	32	25	—12
1891	20	10	— 1	27	38	40	43	48	38	33	26	23	— 1
1892	18	22	31	30	38	40	------	------	------	------	------	------	------
Minimum each month	—12	— 2	— 1	27	31	40	43	42	35	31	21	14	------

BAKER CITY, BAKER COUNTY.

Year.	June.	Feb.	May.	Apr.	May.	June.	July.	Aug.	Sept	Oct.	Nov.	Dec.	Annual.
1889	------	------	------	------	------	------	51	37	27	29	10	2	------
1890	—14	—11	10	18	27	32	37	36	24	21	15	15	—14
1891	0	—11	— 6	19	24	35	38	43	28	23	2	— 6	—11
1892	— 3	—12	9	23	32	27	37	------	------	------	------	------	------
Minimum each month.	—14	—12	— 6	18	24	27	37	36	24	21	2	— 6	------

ASHLAND, JACKSON COUNTY.

Year.	Jan.	Feb.	Mar.	Aug.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	------	— 4	20	26	33	60	42	†44	34	23	22	10	— 4
1885	19	22	25	25	32	36	45	42	34	31	29	26	19
1886	17	26	24	29	25	*41	43	45	35	28	18	24	17
1887	22	12	25	25	27	38	38	40	34	28	16	17	12
1888	— 3	20	21	28	35	40	46	46	40	31	24	26	— 3
1889	16	21	31	33	21	43	44	42	34	37	------	16	16
1890	5	14	21	22	36	37	43	41	40	29	22	20	5
1891	18	18	23	29	31	33	38	45	34	27	24	18	18
1892	21	23	30	26	32	32	------	------	------	------	------	------	------
Minimum each month	— 3	— 4	20	22	21	32	38	40	34	23	16	10	------

*Twenty-eight days. †Twenty-four days.

LA GRANDE, UNION COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1886	------	------	------	------	------	------	50	53	34	28	------	22	22
1887	14	— 2	17	26	30	36	41	41	33	28	1	9	— 2
1888	—34	20	6	29	33	43	43	------	------	------	------	------	—34
1889	------	------	------	31	34	43	41	38	28	32	25	10	10
1890	— 9	—19	24	19	32	40	42	43	28	21	20	18	—19
1891	9	9	2	21	32	38	46	37	26	25	11	1	1
1892	1	1	24	------	31	28	------	------	------	------	------	------	------
Minimum each month.	—34	—19	6	19	30	28	41	37	26	21	1	1	------

ROSEBURG, DOUGLAS COUNTY.

Year.	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Annual.*
1877	------	------	------	------	------	------	48	43	35	28	28	28	------
1878	28	34	34	29	36	43	48	44	38	26	28	17	17
1879	18	22	32	32	34	41	40	45	39	35	24	7	7
1880	25	20	19	30	33	38	45	43	37	29	18	29	18
1881	27	31	28	34	36	41	42	43	35	22	30	27	22
1882	26	16	27	31	34	44	42	40	35	36	23	20	16
1883	12	9	32	34	37	42	46	45	39	32	27	28	9
1884	25	3	28	35	35	43	43	46	------	34	30	19	3
1885	27	29	29	31	39	39	46	46	38	34	32	32	27
1886	23	31	28	33	30	44	44	46	35	33	22	32	22
1887	23	7	29	28	32	39	40	45	36	26	20	26	7
1888	— 6	28	23	29	36	44	45	47	41	33	31	32	— 6
1889	22	22	29	34	40	43	42	45	35	35	29	24	22
1890	21	13	28	26	38	42	45	48	41	32	26	24	13
1891	26	24	31	33	34	38	44	50	38	35	32	27	24
1892	28	28	34	32	38	38	44	------	------	------	------	------	------
Minimum each month	— 6	3	19	26	30	38	40	40	35	22	18	7	------

PRECIPITATION.

Statement showing the total monthly, total annual, and average monthly precipitation at the places named. The precipitation includes rain, melted snow, sleet and hail, and is recorded in inches and hundredths.

LAKEVIEW, LAKE COUNTY.

Year.	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Annual.*
1883	------	------	------	------	------	------	------	------	------	------	0.34	2.67	------
1884	2.70	2.49	4.12	2.35	1.50	6.53	0.60	1.19	1.92	1.63	0.02	1.29	26.34
1885	2.36	2.00	0.20	0.92	1.47	1.40	0.25	0.43	0.02	0.32	6.57	2.15	18.09
1886	3.15	1.26	0.95	1.32	0.97	1.02	0.11	------	------	1.51	0.65	3.13	14.07
1887	2.15	2.23	1.96	1.80	1.05	1.38	0.30	0.54	0.09	0.01	0.32	1.51	12.44
1888	2.85	------	------	0.02	2.80	1.55	0.84	0.01	0.18	0.28	------	------	8.53
1889	------	------	------	------	------	0.23	------	T.	2.29	0.12	T.	------	------
1890	------	------	------	------	------	------	------	------	------	------	------	1.00	3.64
1891	0.49	4.95	2.06	1.09	3.69	2.97	0.90	0.15	0.38	0.18	1.07	6.38	24.31
1892	1.40	0.20	0.76	0.75	0.97	1.39	------	------	------	------	------	------	------
Means	2.64	1.97	1.58	1.28	1.56	2.38	0.42	0.43	0.41	0.75	1.58	1.94	17.74

"T." indicates trace or sprinkle.

BAKER CITY, BAKER COUNTY.

Year.	*Jan.*	*Feb.*	*Mar.*	*April.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Annual.*
1889	------	------	------	------	------	------	T.	T.	0.19	1.46	1.08	1.44	------
1890	1.55	2.08	1.99	0.36	1.33	2.07	1.00	0.12	1.22	1.02	T.	0.75	12.50
1891	2.01	2.50	1.40	0.37	1.37	2.59	1.83	0.43	0.14	0.16	1.31	4.09	18.23
1892	0.39	0.78	1.77	1.82	2.84	1.24	0.03	------	------	------	------	------	------
Means	1.33	1.82	1.72	0.85	1.85	1.97	0.72	0.18	0.52	0.88	0.80	2.06	14.70

"T." indicates trace or sprinkle.

ASTORIA, CLATSOP COUNTY.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1850	------	------	------	------	------	------	------	0.00	1.80	6.70	13.20	6.20	------
1851	27.00	10.95	6.10	4.38	5.95	2.85	0.00	2.30	1.94	------	------	------	*86.35
1853	------	------	------	------	------	------	------	------	4.00	------	13.25	7.93	------
1854	5.60	5.15	------	9.32	2.17	5.23	0.03	3.08	0.82	4.57	4.09	10.16	*60.35
1855	21.52	6.38	7.58	6.77	4.93	1.43	0.94	0.29	4.95	3.29	10.19	10.93	79.20
1856	5.63	3.28	3.84	6.42	3.88	5.12	3.60	0.38	1.84	6.91	7.53	10.74	59.17
1857	16.07	13.05	11.63	0.60	2.04	2.47	0.42	0.28	1.99	2.55	5.94	22.78	79.82
1858	8.58	4.60	6.83	5.28	2.49	1.38	2.30	3.40	3.12	4.88	8.06	12.44	63.36
1859	10.82	12.02	21.32	2.65	3.37	2.10	0.51	1.32	8.45	5.46	7.97	6.16	82.15
1860	13.56	6.05	5.88	5.69	5.04	1.40	1.35	0.78	2.54	7.02	12.41	8.90	70.65
1861	9.70	13.74	7.63	7.92	6.07	6.11	0.19	1.82	2.31	5.99	15.26	16.19	92.93
1862	7.60	5.17	17.41	4.06	2.55	1.36	2.78	1.50	2.21	3.23	2.44	10.98	61.32
1863	18.88	15.53	6.78	4.05	3.64	2.77	2.18	0.59	8.49	6.35	8.12	16.75	94.13
1864	11.64	7.52	13.65	3.12	1.22	3.85	0.87	0.45	4.79	2.16	12.16	14.27	75.70
1865	12.13	6.62	13.25	4.66	3.17	2.88	1.19	2.03	7.64	2.24	16.20	13.21	85.22
1866	16.16	7.33	11.83	7.31	4.52	5.74	0.94	2.17	1.24	9.93	17.73	15.20	100.40
1867	17.52	14.13	2.56	5.70	1.26	1.87	4.27	0.18	1.91	8.21	8.91	24.73	91.25
1868	3.58	4.94	9.06	6.08	4.59	2.76	0.52	0.02	0.33	3.53	8.25	24.08	57.74
1869	11.78	3.18	5.13	6.01	1.33	0.06	0.30	5.87	5.90	1.32	19.12	9.61	69.61
1870	14.89	6.89	8.98	5.62	3.47	3.73	0.73	1.95	2.70	1.81	10.31	10.11	71.19
1871	22.16	10.88	17.11	4.17	6.91	1.03	1.36	0.61	2.36	3.85	14.08	15.90	100.42
1872	8.26	17.57	9.59	7.62	2.54	2.11	0.97	0.61	1.24	4.77	7.10	11.32	73.70
1873	16.06	9.20	18.55	4.48	1.79	4.77	0.95	2.18	0.73	3.43	4.69	7.58	74.41
1874	17.66	12.62	6.69	5.67	3.73	5.06	0.98	2.21	3.00	1.53	13.01	7.82	80.89
1875	8.58	4.40	16.56	4.65	6.83	2.38	0.28	1.16	1.32	13.38	16.70	19.49	95.73
1876	11.91	12.19	12.55	8.70	6.29	4.63	3.55	1.78	1.65	6.50	12.00	3.00	84.75
1884	6.75	7.13	2.56	4.59	1.36	2.04	1.29	1.83	6.22	6.43	2.63	6.55	49.38
1885	6.78	10.59	1.51	1.03	3.43	2.78	0.04	0.02	4.24	3.44	12.45	9.85	56.16
1886	13.24	5.69	7.23	4.99	3.65	2.05	2.58	0.56	4.33	5.57	4.84	16.86	71.59
1887	18.24	8.51	16.11	6.83	7.33	0.63	0.72	0.49	4.82	3.66	8.11	16.64	92.09
1888	13.84	4.12	6.64	4.04	0.79	7.23	1.25	0.74	2.32	7.45	10.45	9.86	68.73
1889	10.67	2.84	5.18	5.59	3.06	2.75	0.10	3.78	5.59	9.64	7.61	8.22	65.03
1890	12.64	11.48	7.56	2.62	1.14	1.23	1.84	1.56	0.13	5.61	1.87	8.81	58.49
1891	6.01	8.01	5.40	5.11	1.80	4.72	1.06	1.46	6.14	7.06	15.18	15.79	77.14
1892	5.46	6.69	3.47	10.27	3.84	1.42	------	------	------	------	------	------	------
Means	12.85	8.51	8.91	5.18	3.56	3.03	1.25	1.45	3.24	5.21	10.21	12.09	75.49

PORTLAND, MULTNOMAH COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1872	6.56	12.13	5.28	2.99	0.90	1.52	0.20	0.13	1.26	1.80	4.67	9.47	46.91
1873	8.49	6.58	12.76	2.35	2.18	2.96	1.02	0.84	0.00	3.86	4.33	5.15	50.52
1874	9.49	4.28	5.15	3.78	2.38	2.68	0.19	0.83	1.70	0.36	10.22	5.24	46.30
1875	4.49	1.99	9.41	2.10	2.87	2.05	0.02	0.53	0.71	6.73	15.77	13.41	60.03
1876	4.80	7.50	9.12	5.31	1.88	2.35	0.96	0.56	1.09	10.53	10.03	0.88	55.04
1877	2.75	7.56	11.31	2.44	2.24	2.05	0.53	1.70	3.36	5.03	12.45	6.87	58.30
1878	6.67	12.16	6.23	1.85	2.17	0.13	1.10	0.50	3.54	3.22	5.61	4.52	47.70
1879	5.28	13.22	11.70	2.19	6.60	2.18	1.75	0.97	2.18	4.23	4.56	7.36	62.22
1880	12.27	5.67	4.48	2.92	3.13	1.59	0.59	1.31	1.34	1.47	3.17	13.93	51.87
1881	8.57	13.36	2.83	3.51	1.38	2.34	1.16	2.11	2.64	6.60	5.91	6.64	57.05
1882	5.06	10.49	2.53	4.60	1.84	1.91	0.95	0.07	0.91	11.58	5.95	20.14	66.03
1883	13.71	2.34	6.40	7.83	1.67	0.08	0.00	0.19	0.67	3.92	8.26	6.34	51.46
1884	3.70	4.88	2.25	5.57	1.34	1.42	1.80	0.33	4.25	4.01	3.24	7.52	38.31
1885	4.57	7.72	0.63	1.12	4.69	1.77	0.24	0.00	2.48	1.66	8.52	7.17	39.57
1886	9.39	1.96	5.39	3.16	1.32	0.67	0.32	0.03	1.19	2.87	1.00	11.52	38.76
1887	12.31	2.81	8.00	5.06	4.77	1.44	0.03	0.58	3.06	1.34	3.43	11.34	54.17
1888	8.50	2.42	2.87	2.06	0.68	5.38	1.01	0.05	1.13	4.97	4.47	5.19	38.76
1889	4.78	1.07	1.80	2.72	4.02	0.51	0.00	0.90	1.61	4.59	3.97	5.59	31.76
1890	11.13	9.85	6.23	1.41	1.08	2.23	0.59	0.13	0.10	2.79	0.50	4.34	40.38
1891	3.62	6.26	2.06	4.00	1.83	4.07	0.24	0.93	2.17	5.04	5.74	11.45	47.41
1892	4.79	2.48	2.82	4.82	1.57	1.41	------	------	------	------	------	------	------
Means	7.50	6.68	6.02	3.21	2.48	1.86	0.65	0.62	1.75	4.30	6.05	8.22	49.34

ROSEBURG, DOUGLAS COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1877	------	------	------	------	------	------	0.75	0.25	1.40	2.75	8.76	4.96	------
1878	8.70	7.30	6.36	0.79	1.62	0.39	1.18	0.46	1.29	2.55	3.55	2.73	36.92
1879	4.74	4.21	8.60	3.67	4.63	0.56	0.15	1.47	1.15	2.20	5.79	7.86	45.03
1880	9.37	2.49	2.81	3.98	1.39	0.68	9.91	0.41	0.47	0.77	0.77	8.29	31.44
1881	11.60	8.19	1.95	1.07	0.73	2.92	0.79	0.46	0.72	5.96	4.15	5.14	43.68
1882	2.22	10.07	3.47	4.32	1.29	0.41	0.91	0.04	0.41	7.07	4.15	11.64	46.00
1883	7.46	1.36	4.31	6.58	2.05	0.22	0.00	0.08	1.07	4.06	4.50	6.72	38.41
1884	3.91	8.90	3.12	4.30	0.89	3.33	1.87	0.43	5.61	2.85	2.18	7.83	45.22
1885	4.20	5.82	0.81	1.38	3.93	1.95	0.00	0.00	2.13	1.75	8.40	7.04	37.41
1886	9.92	3.84	3.19	2.95	1.79	0.36	0.99	T.	1.20	3.28	1.75	10.31	39.08
1887	12.58	4.50	9.03	4.55	2.91	1.21	0.00	0.09	1.67	0.97	5.92	14.21	57.64
1888	10.87	1.26	3.34	1.40	1.00	5.31	0.83	0.00	0.64	3.26	4.13	4.28	36.32
1889	3.96	0.95	2.28	4.12	3.05	0.55	T.	1.17	1.74	6.40	3.04	6.58	33.84
1890	10.63	11.18	6.86	1.77	0.39	1.41	0.38	0.28	0.05	1.74	0.44	3.00	38.13
1891	3.59	11.50	4.13	1.47	3.97	1.87	0.84	0.40	0.95	3.03	3.13	12.02	46.90
1892	4.43	1.58	2.82	3.68	2.18	0.64	------	------	------	------	------	------	------
Means	6.64	4.61	3.28	2.63	1.76	6.94	0.51	0.27	0.78	2.76	3.58	6.41	34.17

"T." indicates trace or sprinkle.

ASHLAND, JACKSON COUNTY.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1879	1.49	1.07	4.55	1.98	3.00	0.67	0.95	0.51	0.14	0.43	3.23	6.31	------
1880	3.18	1.35	2.75	1.73	1.64	0.07	0.94	0.15	0.00	0.51	0.46	2.31	------
1881	12.29	3.58	0.72	0.80	0.09	1.32	0.43	0.00	0.50	3.14	1.76	1.94	------
1882	1.58	2.82	1.40	1.92	0.51	0.13	0.22	0.10	0.00	2.22	1.20	2.69	------
1883	0.95	1.06	0.24	1.81	1.07	0.00	0.00	0.44	0.58	1.55	1.01	3.10	------
1884	1.35	0.95	3.14	1.33	0.76	0.24	0.27	0.00	2.28	1.64	0.07	5.97	18.00
1885	2.41	4.55	0.01	1.52	3.74	2.40	0.02	0.00	1.18	1.53	8.02	3.32	28.00
1886	4.64	1.63	1.43	2.63	1.19	0.72	1.69	0.00	0.00	1.65	1.08	4.66	21.00
1887	4.98	2.71	0.99	3.39	1.15	0.74	0.33	0.04	0.66	0.56	0.94	3.38	19.87
1888	3.81	1.11	1.75	1.01	2.24	5.20	1.29	0.23	0.61	0.83	2.44	1.23	21.80
1889	0.85	0.32	1.72	1.77	2.09	0.31	1.34	0.11	0.09	3.26	2.51	3.50	17.81
1890	3.66	5.42	3.00	0.78	1.91	0.60	0.37	0.79	1.37	0.33	0.05	1.98	20.26
1891	1.25	4.43	2.54	1.08	2.12	2.96	0.75	0.10	1.10	0.81	1.30	5.30	23.94
1892	1.27	0.46	1.26	1.66	1.53	0.83	------	------	------	------	------	------	------
Means	3.44	2.22	1.81	1.72	1.62	1.04	0.65	0.20	0.61	1.56	1.90	3.49	20.26

LA GRANDE, UNION COUNTY.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1886	------	------	------	------	------	------	0 18	0.10	0.40	1.49	------	4.64	6.81
1887	5.18	0.70	2.25	1.29	0.56	2.90	0.33	0.49	0.55	0.51	------	3.78	18.49
1888	1.97	1.69	1.16	1.02	0.73	3.15	1.00	------	------	------	------	------	10.72
1889	------	------	------	2.31	5.31	1.31	0.33	0.04	0.46	2.28	1.62	0.88	14.57
1890	2.20	2.83	2.29	0.41	3.21	2.64	0.33	0.27	0.19	1.17	0.23	0.90	16.70
1891	2.96	3.31	1.71	0.25	0.57	2.77	2.24	0.45	0.65	1.05	2.75	2.80	21.54
1892	1.12	1.15	1.10	------	2.60	0.60	------	------	------	------	------	------	------
Means	2.21	1.62	1.42	0.88	2.18	2.28	0.73	0.22	0.38	1.08	0.77	2.16	------

THE DALLES, WASCO COUNTY.

Year.	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Annual.*
1875	4.17	0.31	2.13	0.59	0.81	1.63	0.14	0.12	0.72	4.80	6.18	4.80	26.40
1876	2.76	1.39	2.20	1.09	0.20	0.34	0.07	0.02	0.13	2.37	4.31	0.46	15.34
1877	0.78	1.68	3.66	1.21	1.03	0.15	0.28	0.10	1.24	1.66	4.18	1.56	17.53
1878	2.96	2.32	1.99	0.20	2.26	0.02	0.08	0.13	1.01	1.53	1.42	1.61	13.53
1879	1.42	6.32	3.15	1.34	0.94	0.11	0.31	0.48	0.78	0.88	1.21	2.57	21.55
1880	2.04	1.33	0.16	1.03	0.94	0.02	0.02	0.43	0.08	0.12	0.69	6.75	13.61
1881	6.37	6.23	0.38	1.29	0.14	1.82	0.11	0.23	0.26	2.67	0.75	1.67	21.92
1882	1.48	2.96	0.23	0.53	0.27	0.60	0.12	0.72	0.43	2.30	0.75	5.14	15.53
1883	4.83	0.61	2.32	1.21	0.54	0.01	0.00	0.10	0.01	0.46	2.19	1.77	14.15
1884	1.33	3.10	0.74	1.33	0.04	0.93	0.44	0.12	0.65	1.27	0.82	7.04	17.81
1885	1.10	2.88	0.14	0.31	0.81	1.01	0.10	0.03	0.87	0.28	1.78	2.64	11.95
1886	5.45	0.53	0.93	0.30	0.11	0.07	0.19	0.02	0.14	0.61	0.21	5.04	13.80
1887	4.01	1.13	0.79	0.46	0.32	0.67	0.07	0.18	0.36	0.15	1.06	3.01	12.21
1888	3.36	0.41	0.94	0.05	0.70	1.92	0.29	0.00	0.02	0.95	1.34	2.71	12.69
1889	0.51	0.01	1.01	0.42	0.66	0.29	T.	T.	0.16	0.90	1.27	2.00	7.29
1890	2.97	4.33	1.89	0.14	0.02	0.27	0.06	0.03	0.11	1.16	0.00	1.19	12.25
1891	1.13	2.47	0.53	0.01	0.32	0.51	0.24	0.11	0.13	1.14	1.39	4.14	12.12
1892	1.35	0.68	0.70	1.00	0.67	0.05	------	------	------	------	------	------	------
Means	3.10	2.22	1.42	0.72	0.61	0.62	0.14	0.18	0.43	1.39	1.76	3.25	15.84

THE OREGON STATE FAIR.

The Oregon State Agricultural Society was organized at Salem, on the 22d day of February, 1860, and held its first fair at Oregon City, commencing October 1, 1861. The Board of Managers then advertised for bids from the different counties for propositions for holding the second fair. The Marion County Agricultural Society made the best offer, and the second State Fair was held near Salem, commencing on Tuesday, the 30th day of September, 1862, and has been held on the same grounds annually ever since.

In February, 1863, the County Court of Marion County assumed liabilities of the Marion County Agricultural Society amounting to $2,900.68, and the Society deeded its land and their appurtenances to the county. On the 7th day of July, 1864, the County Commissioners of Marion County deeded the said land and its appurtenances to the Board of Managers of the Oregon State Agricultural Society in consideration that said Board would hold annual fairs on said grounds for fifteen years. The Oregon State Agricultural society was duly incorporated in the year 1870.

In 1885 the Legislature created a State Board of Agriculture, and appropriated annually $5,000 for the purpose of carrying the said act into operation, with a proviso that no part of said money should be used to pay premiums for trials of speed. In April of that year the new Board met at the capitol and organized. Arrangements were made by which this Board should hold their annual fairs on the grounds of the Oregon State Agricultural Society, and the Board held a fair in 1885, and one each year up to and including 1892. When the State Board of Agriculture took hold of the State Fair Grounds of the State Agricultural Society, the Society was in debt over thirty-five thousand dollars. The Board of Agriculture has paid all of this debt except about ten thousand dollars. Early in 1892 the Society deeded their lands to the State Board of

Agriculture, and Oregon now owns as fine a site for a State Fair as any in the United States. The Grounds comprise about 170 acres of good land, within a mile and a half of the capitol, and with the improvements is worth at least $50,000. The Oregon and California railroad passes across one end of the land, within 400 yards of the pavilion, and two electric street car lines enter the grounds from the heart of the Capital City. The grounds are all under fence, provided with beautiful shady camping grounds, parade grounds, a fine one mile race-course, with ample grand-stands, a commodious new pavilion, office, machinery hall, stables, cattle, and sheep stalls, pens for swine and poultry, a floral garden, and buildings suitable for all purposes about a fair ground.

TABULAR INFORMATION.

The State Board of Agriculture is indebted to the Chamber of Commerce of the City of Portland for the following valuable tables:

STATEMENT SHOWING EXPORTS

From Portland of Wheat and Flour to European ports for the past twelve harvest seasons.

Season ending July 31st.	*Wheat.*		*Flour.*	
	Centals.	*Value.*	*Barrels.*	*Value.*
Season 1879-80	2,083,418	$4,032,907	156,825	$ 876,905
Season 1880-81	1,404,187	2,024,754	319,075	1,355,244
Season 1881-82	3,757,958	6,067,970	492,720	2,218,437
Season 1882-83	1,933,359	3,206,499	352,137	1,676,790
Season 1883-84	2,276,800	3,712,253	331,531	1,656,684
Season 1884-85	3,147,902	3,720,378	198,207	796,839
Season 1885-86	3,971,856	4,979,841	353,869	1,323,877
Season 1886-87	3,042,316	3,889,499	383,773	1,412,208
Season 1887-88	3,203,108	3,783,208	486,456	1,703,936
Season 1888-89	2,659,844	2,736,759	398,223	1,585,505
Season 1889-90	1,779,479	2,245,277	300,945	1,081,432
Season 1890-91	2,876,956	3,977,100	366,611	1,341,430

SHIPMENTS OF SALMON FOR THE PAST TEN YEARS.

Year.	Foreign direct.		Domestic coastwise.				Domestic by rail.				Totals.			
	Cases.	Value.	Cases.	Bbls.	Pkgs.	Value.	Cases.	Bbls.	Pkgs.	Value.	Cases.	Bbls.	Pkgs.	Value.
1882	391,911	$2,064,953	185,276	-------	-------	$ 971,082	-------	-------	-------	----------	577,187	-------	-------	$3,036,035
1883	288,920	1,432,356	361,210	-------	-------	1,848,943	-------	-------	-------	----------	650,130	-------	-------	3,281,299
1884	303,847	1,373,932	136,012	729	815	586,663	151,688	1,268	686	$ 654,775	591,547	1,997	1,501	2,615,370
1885	227,137	928,381	139,873	590	487	565,868	232,479	1,367	728	943,152	599,489	1,957	1,215	2,437,401
1886	157,056	789,769	110,441	194	873	555,198	280,869	227	306	1,401,290	548,366	421	1,179	2,746,257
1887	125,834	709,916	51,965	120	127	294,540	308,447	566	83	1,638,570	486,246	686	220	2,643,026
1888	74,115	504,630	56,392	-------	7	363,505	298,337	270	71	1,919,764	428,844	270	78	2,787,899
1889	135,614	914,110	74,096	245	857	525,245	223,407	112	164	1,565,795	433,117	357	1,021	3,005,150
1890	27,701	131,365	58,111	268	379	316,340	286,732	993	6	1,743,939	372,544	1,261	385	2,194,644
1891	82,178	410,890	44,967	108	1	224,320	235,378	-------	-------	1,183,040	362,523	108	1	1,818,250

In the above, shipments coastwise for 1882 and 1883 include shipments by rail.

DOMESTIC SHIPMENTS COASTWISE BY SEA DURING 1891.

Months.	Flour.		Wheat.		Oats.		Barley.		Flax seed.	
	Barrels.	Value.	Centals.	Value.	Centals.	Value.	Centals.	Value.	Pounds.	Value.
January	10,885	$ 39,825	172,926	$ 198,860	19,510	$ 29,265	34,954	$ 43,840	451,005	$ 11,275
February	4,157	15,485	175,411	206,450	17,360	21,895	25,460	36,500	106,000	2,650
March	8,476	34,530	171,968	224,565	23,005	28,755	24,746	31,420	42,500	1,060
April	5,935	29,175	64,568	102,690	110	155	----------	----------	21,200	530
May	11,791	58,955	31,771	47,655	210	325	----------	----------	665,080	16,650
June	10,056	50,180	17,267	25,900	11,009	16,515	----------	----------	47,800	1,195
July	8,145	39,410	9,830	13,775	5,676	7,545	----------	----------	38,760	970
August	8,103	39,445	30,874	45,855	19,580	25,275	----------	----------	----------	----------
September	5,463	27,065	23,990	34,080	65,757	54,430	----------	----------	----------	----------
October	6,865	32,800	173,244	252,675	14,014	16,070	----------	----------	81,450	2,035
November	10,796	51,835	230,914	390,925	26,000	31,265	----------	----------	30,250	755
December	18,226	90,645	230,709	371,000	20,789	23,450	1,850	2,035	383,450	9,585
Totals	108,898	$ 509,350	1,312,472	$1,914,430	211,020	$ 254,945	87,010	$ 113,795	1,867,565	$ 46,705
1890	81,183	329,813	665,841	778,550	196,316	262,075	50,720	67,620	3,294,188	82,610
1889	80,877	323,439	332,932	400,291	239,533	239,017	----------	----------	4,710,509	117,587
1888	123,345	464,423	1,016,257	1,317,525	280,071	304,053	1,011	955	8,646,183	197,456
1887	78,605	326,327	917,702	1,277,861	123,396	148,940	2,830	2,575	3,437,694	87,939
1886	56,951	207,871	392,905	460,242	197,452	203,035	26,565	27,835	8,006,427	207,229
1885	125,149	455,529	1,212,643	1,456,337	400,643	384,676	128,234	132,682	7,836,543	203,895

DOMESTIC SHIPMENTS COASTWISE BY SEA DURING 1891—*Continued.*

Months.	Hops.		Wool.		Hides—pounds.	Salmon—cases.	Potatoes—sacks.	Green fruit—packages.	Dried fruit—packages.	Onions—sacks.
	Pounds.	Value.	Pounds.	Value.						
January	12,436	$ 4,350	16,057	$ 2,730	159,741	6,018	11,602	996	319	2,229
February	12,914	3,510	4,300	750	369,350	2	16,265	110	35	2,549
March	13,807	3,450	23,459	4,225	286,242		16,545	23	37	1,298
April			2,335	420	223,527	265	17,207	6	496	875
May	2,880	865	455,324	80,805	298,738		4,331	17	613	
June	9,230	2,305	1,342,356	228,195	281,647	332			458	
July	11,319	2,830	1,127,588	202,965	210,995	200		982	143	
August	9,525	2,380	421,079	75,790	399,009	1,528		320		
September			122,788	22,050	348,168	14,838	79	332		
October	6,043	900	38,632	6,955	233,535	17,720	9,399	1,670	409	45
November			79,089	12,650	247,790	3,736	4,674	4,267	241	229
December	19,348	3,205	40,493	7,205	439,102	328	7,353	2,500	962	1,678
Totals	97,538	$ 23,795	3,673,400	$ 641,760	3,497,841	44,967	87,455	11,263	3,693	8,912
1890	76,621	20,785	4,000,789	699,715	3,033,513	58,111	44,833	8,079	3,636	8,613
1889	139,810	14,150	8,313,819	1,320,130	2,001,649	74,096	176,768	9,467	2,324	7,692
1888	160,883	26,823	8,784,736	1,240,513	1,390,099	56,302	136,641	17,138	625	7,807
1887	8,235	880	7,824,736	1,240,513	2,599,000	51,961	69,180	31,144	3,652	8,851
1886	115,857	18,135	5,347,407	954,814	1,973,370	110,441	99,958	76,323	2,727	4,028
1885	24,564	2,940	5,834,038	822,470	1,799,397	139,873	248,844	14,729	444	3,847

RECEIPTS AT PORTLAND OF LEADING ARTICLES OF FARM PRODUCTS FOR THE PAST TEN YEARS.

Years.	Flour—barrels.	Wheat—bushels.	Flour and wheat—equal to bushels of wheat.	Oats—bushels.	Barley—bushels.	Flaxseed—pounds.	Hops—pounds.	Wool—pounds.	Hides—pounds.	Potatoes—sacks.	Green fruit—packages.	Butter—packages.	Eggs—packages.	Millstuff—tons.
1882-3	471,016	3,433,012	5,566,114	464,375	10,336	10,692,045	629,617	8,152,682	1,631,810	37,803	46,427	4,015	15,632	5,363
1883-4	508,825	4,813,420	7,103,133	350,722	11,517	3,681,171	1,808,113	9,473,191	1,474,325	24,818	30,290	3,324	15,850	4,767
1884-5	341,988	6,667,470	8,206,416	932,947	148,525	3,279,276	5,547,264	12,817,918	1,556,088	117,563	69,128	4,703	24,090	7,030
1885	344,821	9,708,560	11,260,254	1,390,131	345,929	8,174,790	5,210,827	12,471,962	1,797,177	105,360	169,610	4,349	26,083	6,084
1886	351,277	9,221,841	10,819,088	888,959	129,252	7,971,018	6,832,368	13,507,747	1,829,445	55,050	120,782	2,823	23,239	7,321
1887	302,299	6,512,430	7,872,776	571,953	88,563	6,631,369	1,620,340	12,531,479	2,868,130	31,818	91,325	2,866	19,269	5,721
1888	470,281	9,176,726	11,292,989	1,186,563	82,869	5,528,088	4,099,060	14,423,322	2,251,718	83,735	112,906	6,929	21,748	8,793
1889	448,315	5,192,787	7,210,340	1,569,884	30,302	10,211,016	2,242,503	16,029,671	1,956,728	112,971	171,710	6,996	29,756	11,475
1890	442,266	6,193,175	8,183,372	1,547,459	410,669	9,463,969	2,137,343	7,720,631	3,565,681	84,222	202,218	5,083	31,312	7,260
1891	531,642	9,641,795	12,034,184	1,246,019	295,482	2,591,985	1,899,676	4,457,652	1,855,584	94,710	273,196	8,034	38,833	8,839

NOTE.—The first three of the above years are those ending July 31st; the others are for the calendar years.

POPULATION OF OREGON.

The following shows the population of the State of Oregon by counties according to the United States census in 1860, 1870, 1880, and 1890.

Counties.	Population.			
	1890.	1880.	1870.	1860.
Baker	6,764	4,616	2,804	----------
Benton	8,650	9,403	4,584	3,074
Clackamas	15,233	9,260	5,993	3,466
Clatsop	10,016	7,222	1,255	498
Columbia	5,791	2,042	863	532
Coos	8,874	4,834	1,641	445
Crook	3,244	----------	----------	----------
Curry	1,709	1,208	504	393
Douglas	11,864	9,596	6,066	4,453
Gilliam	3,600	----------	----------	----------
Grant	5,080	4,803	2,251	----------
Harney	2,559	----------	----------	----------
Jackson	11,455	8,154	4,778	3,736
Josephine	4,878	2,485	1,204	1,623
Klamath	2,344	----------	----------	----------
Lake	2,601	2,804	----------	----------
Lane	15,198	9,411	6,426	4,780
Linn	16,265	12,676	8,717	6,772
Malheur	2,601	----------	----------	----------
Marion	22,934	14,576	9,965	7,088
Morrow	4,205	----------	----------	----------
Multnomah	74,884	23,203	11,510	4,150
Polk	7,858	6,601	4,701	3,625
Sherman	1,792	----------	----------	----------
Tillamook	2,931	970	408	95
Umatilla	13,881	9,607	2,916	----------
Union	12,014	6,650	2,552	----------
Wallowa	3,661	----------	----------	----------
Wasco	9,183	11,120	2,509	1,689
Washington	11,972	7,082	4,261	2,801
Yamhill	10,692	7,915	5,012	3,215
Totals	313,767	174,768	90,923	52,465

The following shows the population, by the United States census of 1890 and 1880, of all cities and towns in the State of Oregon having a population of 1,000 or more.

Cities and towns.	Counties.	Population.	
		1890.	1880.
Albany	Linn	3,079	1,867
Ashland	Jackson	1,781	842
Astoria	Clatsop	6,181	2,803
Baker City	Baker	2,701	1,258
Corvallis	Benton	1,527	1,128
Dalles City	Wasco	3,507	2,232
Eugene	Lane	4,111	2,330
Grants Pass	Josephine	1,432	----------
La Grande	Union	2,583	----------
Marshfield	Coos	1,461	612
McMinnville	Yamhill	1,368	670
Oregon City	Clackamas	3,062	1,263
Pendleton	Umatilla	2,906	730
Portland	Multnomah	66,784	21,640
Roseburg	Douglas	1,472	822
Salem	Marion	10,470	4,796

CEREAL PRODUCTION IN 1889.

Compiled from various census bulletins by W. W. BAKER, Esq., publisher "Rural Spirit and Willamette Farmer," Portland, Oregon.

Counties.	Barley.		Buckwheat.		Indian corn.		Oats.		Rye.		Wheat.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Baker	1,417	34,350			17	520	2,633	61,154	28	200	2,534	56,739
Benton	329	8,433	7	116	23	534	12,929	391,842	80	1,689	18,415	394,533
Clackamas	317	9,495	78	638	326	5,988	13,902	373,926	279	4,802	11,941	251,130
Clatsop							225	6,395			13	210
Columbia	14	500	1	15	23	665	316	10,601	2	100	165	3,671
Coos	352	12,840	2	37	379	11,838	792	27,361	8	35	613	13,905
Crook	392	5,876			9	185	945	16,454	1,656	18,143	688	8,612
Curry	113	2,991	4	28	54	1,414	478	16,211	1	10	30	680
Douglas	1,900	50,610	1	35	2,331	64,308	14,397	359,369	20	230	19,693	357,124
Gilliam	1,160	16,012			362	3,488	754	10,203	467	3,140	14,698	81,461
Grant	1,019	23,702			9	209	702	19,312	148	1,559	1,327	26,479
Harney	1,281	21,012			1	25	481	11,179	280	2,672	411	7,765
Jackson	1,675	40,299	2	40	3,162	43,325	2,712	51,088	30	341	17,073	253,103
Josephine	268	8,035			892	16,131	1,387	27,358	107	1,588	1,298	20,071
Klamath	571	10,690					1,013	13,538	777	4,116	2,013	17,032
Lake	746	11,429			1	32	185	6,155	406	1,504	560	7,741
Lane	2,052	54,783	7	64	927	20,081	20,393	459,995	82	1,411	27,304	443,789
Linn	1,005	22,864	29	135	512	11,543	37,277	906,356	220	3,221	55,374	1,116,074
Malheur	696	21,596			228	7,384	548	13,550	5	70	284	5,800
Marion	927	30,411	61	674	911	18,730	33,710	978,030	188	2,917	50,902	1,169,755
Morrow	2,297	41,429			363	5,701	865	10,763	362	1,739	26,094	173,424
Multnomah	33	865	1	60	27	1,070	1,289	44,430	15	411	574	12,134
Polk	672	22,812	19	390	70	1,669	16,368	508,655	39	826	42,138	1,014,580
Sherman	1,383	12,811			10	50	315	1,282	8	50	32,445	148,891
Tillamook	50	1,402			3	52	134	5,175	3	30	4	100
Umatilla	8,119	161,568			647	9,783	2,946	70,872	729	6,101	127,045	1,642,378
Union	6,226	188,098			37	1,015	9,455	273,053	200	2,815	30,226	614,577
Wallowa	668	16,552			10	185	1,323	38,834	453	5,003	1,792	28,875
Wasco	971	9,760			441	5,239	1,215	9,227	140	1,377	7,344	31,813
Washington	286	9,694	23	310	56	1,194	16,203	538,783	60	1,148	21,429	494,908
Yamhill	809	24,114	15	136	240	5,845	22,819	687,461	52	955	38,783	894,740
Totals	37,803	875,063	250	2,678	12,101	278,203	218,736	5,948,594	6,845	63,205	553,270	9,298,224

Officers of the State Board of Agriculture.

J. T. Apperson—President.....Oregon City
M. Wilkins—Vice-President.....Coburg
J. T. Gregg—Secretary.....Portland
Geo. W. Watt—Assistant Secretary.....Salem
A. Bush—Treasurer.....Salem

Members of the Board.

J. T. Apperson.....Oregon City
T. L. Davidson.....Salem
R. E. Bybee.....Portland
Gaines Fisher.....Salem
Wm. Galloway.....McMinnville
D. M. Guthrie.....Dallas
Daniel G. Hoult.....Phœnix
W. F. Matlock.....Pendleton
Z. F. Moody.....The Dalles
J. C. Simpson.....Siuslaw
M. Wilkins.....Coburg
John G. Wright.....Salem

Note.—On the second page of this volume appears a list of the officers and members of the Oregon State Board of Agriculture; but owing to the fact that some changes have occurred in the Board since the same was printed, the above is inserted in a corrected form.

Conclusion.

The State Board of Agriculture desires to express thanks to the gentlemen who have kindly contributed to the foregoing pages. The principal aim while preparing this report has been to furnish accurate information concerning the resources of Oregon. All the statements therein contained will be found true; the contributors are reliable men, and their articles are written with a full knowledge of the subjects respectively treated. There has been no disposition on the part of the Board, its secretary, or any of the writers to overstate any feature of Oregon's resources; and it is confidently asserted, that upon investigation the facts will show a more favorable condition than is represented in this report.

Respectfully submitted,

THE OREGON STATE BOARD OF AGRICULTURE.

By J. T. Gregg, Secretary.

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